

**Argonne National Laboratory**

**COMPUTER PROGRAM FOR  
CALCULATING THE RELATIVE YIELDS  
OF ISOMERS PRODUCED  
IN NUCLEAR REACTIONS**

**by**

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I. INTRODUCTION

The following program has been written to compute the relative cross sections of isomers produced in nuclear reactions. The theoretical formalism has been given in references 1 and 2. The program is divided into three main parts.

Part I. Computation of the partial compound nucleus cross sections and the normalized initial compound nucleus spin distribution.

The cross section for the formation of a compound nucleus with spin  $J_C$  at a bombarding energy  $E$  is given by

$$\sigma(J_C, E) = \pi \lambda^2 \sum_{S=|I-s|}^{I+s} \sum_{\ell=|J_C-S|}^{J_C+S} \frac{2J_C+1}{(2s+1)(2I+1)} T_\ell(E) ,$$

where

$\lambda$  = de Broglie wavelength of the incoming projectile,

$I$  = spin of the target nucleus,

$s$  = spin of the projectile,

$T_\ell(E)$  = transmission coefficient of a particle with orbital angular momentum  $\ell$  and energy  $E$ ,

$J_C(\max) = \ell_{\max} + s + I$ ,

Computed for  $J_C = \frac{0}{2}, \frac{1}{2}, \frac{2}{2}, \frac{3}{2}, \frac{5}{2}, \dots, J_C(\max)$

<sup>1</sup>J. R. Huizenga and R. Vandenbosch, Phys. Rev., 120, 1305 (1960)

<sup>2</sup>R. Vandenbosch and J. R. Huizenga, Phys. Rev., 120, 1313 (1960)

The first part of the program utilizes the above equation to compute the normalized initial compound nucleus spin distribution. The necessary input parameters are the following:

- 1) target spin =  $I$ ;
- 2) projectile spin =  $s$ ;
- 3) proportionality constant =  $\pi\lambda^2$ .

If one is interested only in a normalized spin distribution  $P_{J_C}$ , this constant can be set equal to 1. However, if the absolute cross section as a function of  $J_C$  is desired, one must put in the above proportionality constant;\*

- 4) transmission coefficients as a function of  $\ell$  for desired reaction.

The output quantities of this stage of the calculation are the partial cross sections  $\sigma(J_C, E)$ ,  $P_{J_C}$ , running sum of  $P_{J_C}$ , and  $\langle J_C^2 \rangle_{av}$ , where  $P_{J_C}$  is defined as the probability that the compound nucleus has spin  $J_C$  or

$$P_{J_C} = \sigma(J_C, E) \left/ \sum_{J_C=0}^{\infty} \sigma(J_C, E) \right..$$

It should be noted that the spin cutoff factor  $\sigma$  does not enter into this stage of the calculation.

#### Part II. Computation of the normalized spin distribution following particle emission.

A particular state with spin  $J_C$  can decay by particle emission to final states with a variety of spin values, each of which are denoted by  $J_f$ . The relative probability for an initial state  $J_C$  for emitting a particle to a final state of spin  $J_f$  is given by

$$P(J_f)_{J_C} \propto \rho(J_f) \sum_{S=|J_f-s'|}^{J_f+s'} \sum_{\ell'=|J_C-S|}^{J_C+S} T'_{\ell'}(E) \quad ,$$

where  $s'$  is the intrinsic spin of the emitted particle,  $T'_{\ell'}(E)$  the transmission coefficient of the emitted particle with angular momentum  $\ell'$  and energy  $E$ , and

$$\rho(J_f) \propto (2J_f+1) \exp [-(J_f+\frac{1}{2})^2/2\sigma^2] \quad ,$$

where  $\sigma$  is the spin cutoff factor.

---

\*It is often convenient to express  $\pi\lambda^2$  in units of  $10^{-24} \text{ cm}^2$  so that the partial cross sections appear in units of barns.

The normalized yield of spin  $J_f$  coming from initial spin  $J_c$  is obtained by multiplying the initial normalized yield of  $J_c$  by the fraction of  $J_c$  decaying to  $J_f$ . The total normalized yield of  $J_f$  is computed by summing over all values of  $J_c$  and is given by the following equation:

$$P_{J_f} = \frac{P_{J_c}}{\sum_{J_f = J_c + \ell'_c \max + s'}^{\infty} \rho_{J_f} \frac{\sum_{s=|J_f-s'|}^{J_f+s'} T'_{\ell'}}{\sum_{s=|J_f-s'|}^{J_f+s'} T'_{\ell'}}}$$

$$P_{J_c} = \begin{cases} J_{c \max} & \text{for } J_f + \ell'_c \max + s' \leq J_{c \max} \\ J_f + \ell'_c \max + s' & \text{for } J_f + \ell'_c \max + s' > J_{c \max} \end{cases}$$

$$\rho_{J_f} = \begin{cases} J_{cI} & \text{for } J_f - \ell'_c \max - s' \leq 0 \\ J_f - \ell'_c \max - s' & \text{for } J_f - \ell'_c \max - s' > 0 \end{cases}$$

$$J_f = \begin{cases} J_{fI} & \text{for } J_c - \ell'_c \max - s' \leq 0 \\ J_c - \ell'_c \max - s' & \text{for } J_c - \ell'_c \max - s' > 0 \end{cases}$$

where

$$\rho_{J_f} = (2J_f + 1) \exp \frac{-(J_f + \frac{1}{2})^2}{2\sigma^2} \text{ for } J_f = J_{fI}, J_{fI} + 1, \dots, J_{f \max}$$

$$J_{f \max} = \ell'_c \max + s' + J_{c \max}$$

$J_{c \max}$  = Maximum value of the index  $J_c$  from the input  $P_{J_c}$

$J_{cI}, J_{fI}$  are initial values of the indices  $J_c$  and  $J_f$  [i.e., if  $J_{c \max}$  is integer, then  $J_{cI} = 0$ ; if  $J_{c \max}$  is half integer, then  $J_{cI} = \frac{1}{2}$  similarly if  $J_{f \max}$  is integer, then  $J_{fI} = 0$  and if  $J_{f \max}$  is half integer then  $J_{fI} = \frac{1}{2}$ ].

$P_{J_c}$  are the normalized initial spin distribution from the initial compound nucleus.

$T'_{\ell'}$  are the transmission coefficients

$s'$  is the outgoing particle spin

$\ell'_c \max$  is the maximum value of the index  $\ell'$  for the input  $T'_{\ell'}$ .

The input parameters for this part of the program are

- 1) normalized compound nucleus spin distribution  
(output of Part I),
- 2) spin of emitted particle  $s'$ ,
- 3) transmission coefficients of emitted particle  $T'_{\ell}$ , and
- 4) value of spin cutoff factor  $\sigma$ .

The transmission coefficients of the emitted particle must be supplied from some external source. These are available for most particles at various energies from both square-well and optical-model calculations. In certain calculations it may be sufficient to use a single set of transmission coefficients which are associated with the average energy of the evaporated particle. In other calculations it may be necessary to subdivide the problem into several parts, each part dealing with emitted particles of a selected energy bin and its associated transmission coefficients. The weighting of the bins and final summation of the various probabilities is not performed by the program since in most of our calculations to date we have used an average energy of the outgoing particle and, hence, a single set of transmission coefficients.

The program will compute the spin distribution following successive particle emission as long as the above input parameters are specified for each evaporated particle. Of course, the input spin distribution for the second particle to be evaporated is the output spin distribution of the first particle, etc.

### Part III. Computation of the normalized spin distribution following gamma-ray emission.

After the last particle is emitted, the final stage of de-excitation takes place by emission of one or a cascade of gamma rays. The probability of decaying from a state  $J_i$  to state  $J_f$  is assumed to be simply proportional to the density of final states with spin  $J_f$ . The total normalized yield of  $J_f$  is given by the following formula:

$$F_{J_f} = \sum_{\substack{J_i=|J_f-\ell| \\ J_f=|J_i-\ell|}}^{J_f+\ell} \frac{F_{J_i} \rho(J_f) \delta_{J_i, J_f}}{\sum_{J_f=|J_i-\ell|}^{J_i+\ell} \rho(J_f)}$$

$$\rho(J_f) = (2J_f + 1) \exp - \frac{(J_f + \frac{1}{2})^2}{2\sigma^2}$$

$$J_{f\max} = J_{i\max} + \ell ; \quad \delta_{J_i, J_f} = 1 \text{ if } |J_i - J_f| \leq \ell \leq |J_i + J_f| ;$$

$$\delta_{J_i, J_f} = 0 \quad \text{otherwise*}$$

$\ell$  - multipolarity of gamma emission

$\sigma$  - spin cutoff factor

$F_{J_i}$  - normalized initial spin distribution (following last particle emission)

## II. PROGRAM DESCRIPTION

This Fortran II Program, written for the IBM 704, consists of three subprograms, each one of which computes a separate spin distribution for nuclear reactions. They are the Normalized Initial Compound Nucleus Spin Distribution, Normalized Spin Distribution following Particle Emission, and Normalized Spin Distribution following Gamma-ray Emission. The particle-emission and gamma-ray cases allow the operator to compute the spin distribution after the emission of each of M particles and/or each of N gamma rays.

This Program will allow for great generality in the choice of number and combination of the three separate subprograms to be performed. Six different arrangements of the calculations are possible:

1. Initial Compound Nucleus Spin Distribution only.

2. Normalized Spin Distribution following Particle Emission only.

This may be done for the emission of any number of particles, in which case the final Normalized Spin Distribution following the emission of particle j becomes the initial Normalized Spin Distribution used in the calculations for the emission of particle j+1.

3. Normalized Spin Distribution following Gamma-ray Emission only. This may be done for the emission of any number of gamma rays, in which case the final Normalized Spin Distribution following the emission of gamma ray j is used as the initial normalized spin distribution used in the calculations for the emission of gamma ray j+1.

4. Initial Compound Nucleus Computation followed by computations for emission of M particles. The final spin distribution from the

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\*This condition arises from selection rules forbidding photon transitions such as  $0 \rightarrow 0$  for dipole and  $0 \rightarrow 0$ ,  $0 \rightarrow 1$ , and  $1 \rightarrow 0$  for quadrupole.

compound nucleus is used as initial spin distribution for the first particle-emission computation. If  $M > 1$ , then the program operates as in the particle-emission case, and the final spin distribution for particle  $j$  becomes the initial spin distribution for particle  $j+1$ .

5. Particle Emission Calculations followed by Gamma-ray Calculations. This possibility allows the spin distribution for the emission of  $M$  particles to be completed as in Type 2 Calculations, and then the last particle-emission, final spin distribution is used as the initial spin distribution for the first gamma-ray emission. The initial spin distribution has to be normalized so that the sum is 1.000. If the number of gamma rays emitted is greater than one, then the Program will operate as in Type 3 calculations, from this point on.

6. Compound Nucleus Computation followed by  $M$  particle-emission cases followed by  $N$  gamma-ray emissions. This type of computation is a combination of Types 1 followed by Type 2 followed by Type 3 computations.

### III. RESTRICTIONS

A minimum 704 with a floating-point underflow feature is required.

### IV. USAGE

The program requires no sense switches or special console settings. The instructions and data cards described in Sect. VII are placed behind the program deck. The computer automatically stops when the last data card has been processed.

### V. OUTPUT

Output is on tape 6 in BCD form in the present program and may be easily listed off-line. Carriage control information is contained in the FORTRAN format statements to produce listings similar to the sample listing included. The tape on which the output is written is optional. The variable K TAPE controls the tape unit on which the output is written. If a tape unit different from unit 6 is desired, the user may change the value of K TAPE on statement 22222 K TAPE = 6. If, for example, it is desired to write on unit 7, statement 22222 should be changed to read 22222 K TAPE = 7.

## VI. CHECKOUT

Cards for a sample problem, of type 6, are included. The output should be identical with that of the sample listings included. A sample of the data-preparation formats are included which will produce the input cards for the sample problem. FORTRAN listings of the program are also included.

## VII. DATA CARD FORMATS

## A. Card Formats to perform a Type 1 or Compound Nucleus Calculation

## 1. Format (72H)

Identification of problem: reaction, Problem Number, etc.

P is required in column 1

identification in columns 2-72

i.e., Pb<sub>bbb</sub>AG-107b+b35bMEVbHE4

Note: b indicates a blank column. Spacing on this CARD is at the discretion of the user.

## 2. Format (I2)

Column 1 = 0

Column 2 = 1

This CARD indicates the Type of Problem to be done.

## 3. Format (3E15.8, I3)

This CARD contains the values of the Target Spin, Projectile Spin, Proportionality Constant and Number of Transmission Coefficients to be used.

Target Spin in columns 1-15

Projectile Spin in columns 16-30

Proportionality Constant in columns 31-45 must be Nonzero

Number of Transmission Coefficients in columns 46-48

i.e., +0.10000000E+01+0.50000000E+00+0.10000000E+01027

## 4. Format (E15.8,5X,F4.1)

Transmission Coefficient in columns 1-15

Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 has the value of L

+0.10000000E+01bbbL=20.0

or +0.10000000E+01bbbL=01.0

There should be as many cards of this Type as was specified in columns 46-48 of 3.

1-4 Constitute all of the input data required to perform a Type 1 Calculation.

## B. Card Formats to perform a Type 2 or Particle-emission Calculation

### 1. Format (72H)

Identification of problem: reaction, Problem Number, etc.

P is required in column 1

identification in columns 2-72

i.e., Pb<sub>b</sub>bAG-107b+b35bMEVbHE4

Note: b indicates a blank column. Spacing on this CARD is at the discretion of the user.

### 2. Format (I2)

Column 1 = 0

Column 2 = 2

This card indicates the Type of Problem to be done.

### 3. Format (I2)

The Number of Particles to be emitted - NPE must be Nonzero

NPE goes in columns 1 and 2

i.e., for 7 particles to be emitted, 07

### 4. Format (I2)

The number of values of the Initial Spin Distribution to be used - NJC

NJC goes in columns 1 and 2

i.e., for 21 values the card is of the form: 21

### 5. Format (E15.8,5X,F4.1)

Initial Spin Distribution in columns 1-15

Columns 16, 17 are blank

Column 18 is a J

Column 19 is a C

Column 20 is an equal sign (=)

Columns 21-24 has the value of JC

i.e., +0.10000000E+01bbJC=16.0

One value per card. There should be as many cards of this type as was specified in 4.

### 6. Format (F6.3)

Outgoing Particle Spin in columns 1-6

i.e., 00.500

## 7. Format (I2)

Number of Transmission Coefficients to be used in computations must be Nonzero  
Value goes in columns 1 and 2  
i.e., 07, 21

## 8. Format (E15.8,5X,F4.1)

Values of the Transmission Coefficient in columns 1-15  
Columns 16-18 are blank  
Column 19 is an L  
Column 20 is an equal sign (=)  
Column 21-24 is the value of L  
i.e., +0.1000000E+00bbbL=15.0

## 9. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 03.000

1-9 constitutes the data required to perform a Type 2 Calculation provided only one particle is emitted. If more than one particle emission is desired, additional data must be prepared for each particle emission.

## 10. Format (I2)

Number of Transmission Coefficients to be used in Computations.  
Must be Nonzero  
Value goes in columns 1 and 2  
i.e., 07, 21.

## 11. Format (E15.8,5X,F4.1)

Values of the Transmission Coefficient in columns 1-15  
Columns 16-18 are blank  
Column 19 is an L  
Column 20 is an equal sign (=)  
Column 21-24 is the value of L  
i.e., +0.1000000E+00bbbL=15.0

## 12. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 03.000

For each additional particle emitted, the program requires 10-12 be added. Thus, to perform a Type 2 Calculation with the emission of 3 particles, the data needed would be:

- (1-9) gives the emission of particle 1
- (10-12) for particle 2
- (10-12) for particle 3

## C. Card formats to perform a Type 3 or Gamma-ray-emission Calculation

## 1. Format (72H)

Identification of problem: reaction, Problem Number, etc.

P is required in column 1

identification in columns 2-72

i.e., Pb<sub>b</sub>bAG-107b+b35bMEVbHE4

Note: b indicates a blank column. Spacing on this CARD  
is at the discretion of the user.

## 2. Format (I2)

Column 1 = 0

Column 2 = 3

This CARD indicates the Type of Problem to be done.

## 3. Format (I2)

Number of initial spins to be used - NFJI

Must be Nonzero

NFJI goes in columns 1 and 2

i.e., for 10 values of initial spin 10

## 4. Format (E15.8,5X,F4.1)

Value of initial spin in columns 1-15

Column 16, 17 are blank

Column 18 has a J

Column 19 has an I

Column 20 has an equal sign (=)

Column 21-24 has the value of JI

i.e., +0.1000000E+01bbJI=00.5

## 5. Format (I2)

Number of Gamma Rays to be emitted - NGE

Must be Nonzero

NGE goes in columns 1 and 2

i.e., for 3 gamma rays to be emitted 03

## 6. Format (F6.3)

Value of Sigma goes in columns 1-6

i.e., 05.000

## 7. Format (I2)

Multipolarity of Gamma-ray Emission - L  
L goes in columns 1 and 2  
i.e., 01, 02

1-7 constitutes all of the data required to perform the Type 3 Calculation for a Single Gamma-ray Emission.

If more than one gamma-ray emission is desired, additional data must be prepared for each emission.

## 8. Format (F.6.3)

Value of sigma goes in columns 1-6  
i.e., 05.000

## 9. Format (I2)

Multipolarity of Gamma-ray Emission, L  
L goes in columns 1 and 2  
i.e., 01, 02

Thus, to perform a Type 3 calculation with the emission of 3 gamma rays, the data required are:

(1-7) gives emission of gamma ray 1

(8, 9) gives emission of gamma ray 2

(8, 9) gives emission of gamma ray 3

D. Card Formats to perform a Type 4 Calculation or Compound Nucleus followed by the emission of M particles.

1. Format (72H)

Identification of problem: reaction, Problem Number, etc.

P is required in column 1

identification in columns 2-72

i.e., Pb<sub>bbb</sub>AG-107b+b35bMEV6HE4

Note: b indicates a blank column. Spacing on this CARD is at the discretion of the user.

2. Format (I2)

Column 1 = 0

Column 2 = 4

This card indicates the type of problem to be done.

3. Format (3E15.8,I3)

This card contains the values of the Target Spin, Projectile Spin, Proportionality Constant, and number of Transmission Coefficients to be used.

Target Spin in columns 1-15

Projectile Spin in columns 16-30

Proportionality Constant in columns 31-45 Must be Nonzero

Number of transmission coefficients in columns 46-48

i.e., +0.1000000E+01+0.5000000E+00+0.1000000E+01027

4. Format (E15.8,5X,F4.1)

Transmission Coefficient in columns 1-15

Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 has the value of L

+0.1000000E+01bbbL=20.0

or +0.1000000E+01bbbL=01.0

There should be as many cards of this type as was specified in columns 46-48 of 3

5. Format (I2)

The number of particles to be emitted - NPE  
Must be Nonzero

NPE goes in columns 1 and 2

i.e., for 7 particles to be emitted 07

6. Format (F6.3)

Outgoing particle spin in columns 1-6  
i.e., 00.500

7. Format (I2)

Number of Transmission Coefficients to be used in Computations.

Must be Nonzero

Value goes in columns 1 and 2  
i.e., 07, 21.

8. Format (E15.8,5X,F4.1)

Values of the Transmission Coefficient in columns 1-15  
Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 is the value of L  
i.e., +0.1000000E+00bbbL=15.0

9. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 03.000

1-9 constitutes the data required to perform a Type 4 Calculation provided only one particle is emitted. If more than one particle is desired, additional data must be prepared for each particle emission.

10. Format (I2)

Number of Transmission Coefficients to be used in Computations

Must be Nonzero

Value goes in columns 1 and 2  
i.e., 07, 21.

11. Format (E15.8,5X,F4.1)

Values of the Transmission Coefficient in columns 1-15  
Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 is the value of L  
i.e., +0.1000000E+00bbbL=15.0

## 12. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 03.000

For each additional particle emitted, the program requires 10, 11, 12 be added. Thus, to perform a Type 4 Calculation with the emission of 3 particles, the data needed would be:

- 1-9 gives the Compound Nucleus followed by the Emission of Particle 1
- (10-12) gives the Emission of particle 2
- (10-12) gives the Emission of particle 3

E. Card Formats to perform a Type 5 calculation or M particle emissions followed by N gamma-ray emissions.

1. Format (72H)

Identification of problem: reaction, Problem Number, etc.

P is required in column 1

identification in columns 2-72

i.e., Pb<sub>b</sub>bAG-107b+b35bMEVbHE4

Note: b indicates a blank column. Spacing on this CARD  
is at the discretion of the user.

2. Format (I2)

Column 1 = 0

Column 2 = 5

This card indicates the type of problem to be done

3. Format (I2)

The number of Particles to be emitted - NPE

Must be Nonzero

NPE goes in columns 1 and 2

i.e., for 7 particles to be emitted 07

4. Format (I2)

The number of values of the initial Spin distribution to  
be used - NJC

NJC goes in columns 1 and 2

i.e., for 21 values the card is of the form: 21

5. Format (E15.8,5X,F4.1)

Initial spin distribution in columns 1-15

Columns 16, 17 are blank

Column 18 is a J

Column 19 is a C

Column 20 is an equal sign (=)

Columns 21-24 has the value of JC

i.e., +0.1000000E+01bbJC=16.0

One value per card. There should be as many cards of this  
type as was specified in 4.

6. Format (F6.3)

Outgoing particle spin in columns 1-6

i.e., 00.500

## 7. Format (I2)

Number of Transmission Coefficients to be used in Computations.

Must be Nonzero

Value goes in columns 1 and 2  
i.e., 07, 21.

## 8. Format (E15.8,5X,F4.1)

Values of the Transmission Coefficient in columns 1-15

Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 is the value of L  
i.e., +0.10000000E+00bbbL=15.0

## 9. Format (F6.3)

Value of Sigma goes in columns 1-6

i.e., 03.000

1-9 constitutes the data required to perform a Type 5 calculation provided only one particle is emitted.

## 10. Format (I2)

Number of Transmission Coefficients to be used in Computations.

Must be Nonzero

Value goes in columns 1 and 2  
i.e., 07, 21.

## 11. Format (E15.8,5X,F4.1)

Values of the Transmission Coefficient in columns 1-15

Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 is the value of L  
i.e., +0.10000000E+00bbbL=15.0

## 12. Format (F6.3)

Value of Sigma goes in columns 1-6

i.e., 03.000

For each additional particle emitted, the program requires 10-12 be added. Thus to perform a Type 5 calculation with the emission of 3 particles, the data needed would be:

- (1-9) gives the emission of particle 1
- (10-12) for particle 2
- (10-12) for particle 3

13. Format (I2)

Number of Gamma Rays to be emitted -NGE  
Must be Nonzero  
NGE goes in columns 1 and 2  
i.e., for 3 gamma rays to be emitted 03

14. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 05.000

15. Format (I2)

Multipolarity of Gamma-ray Emission - L  
L goes in columns 1 and 2  
i.e., 01, 02.

1-15 constitutes all of the data required to perform the Type 5 calculations for m particle emission followed by a single gamma-ray emission. If more than one gamma-ray emission is desired, additional data must be prepared for each emission.

16. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 05.000

17. Format (I2)

Multipolarity of Gamma-ray Emission - L  
L goes in columns 1 and 2  
i.e., 01, 02.

Thus, to perform a Type 5 calculation with the emission of 3 gamma rays, the data required are:

- (1-15) Gives emission of all particles and of gamma ray 1
- (16, 17) Gives emission of gamma ray 2
- (16, 17) Gives emission of gamma ray 3

F. Card Formats to perform a Type 6 calculation or a compound nucleus followed by emission of M particles followed by emission of N gamma rays.

1. Format (72H)

Identification of problem: reaction, Problem Number, etc.

P is required in column 1

identification in columns 2-72

i.e., Pb<sub>bbb</sub>AG-107b+b35bMEVbHE4

Note: b indicates a blank column. Spacing on this CARD  
is at the discretion of the user.

2. Format (I2)

Column 1 = 0

Column 2 = 6

This card indicates the type of problem to be done.

3. Format (3E15.8, I3)

This card contains the values of the Target Spin,  
Projectile Spin, Proportionality Constant, and number  
of Transmission Coefficients to be used.

Target Spin in columns 1-15

Projectile Spin in columns 16-30

Proportionality Constant in columns 31-45 must be Nonzero

Number of transmission coefficients in columns 46-48

i.e., +0.10000000E+01+0.50000000E+00+0.10000000E+01027

4. Format (E15.8,5X,F4.1)

Transmission Coefficient in columns 1-15

Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 has the value of L

+0.10000000E+01bbbL=20.0

or +0.10000000E+01bbbL=01.0

There should be as many cards of this type as was  
specified in columns 46-48 of 3.

5. Format (I2)

The number of particles to be emitted -NPE

Must be Nonzero

NPE goes in columns 1 and 2

i.e., for 7 particles to be emitted 07

6. Format (F6.3)

Outgoing particle spin in columns 1-6  
i.e., 00.500

7. Format (I2)

Number of Transmission Coefficients to be used in Computations.

Must be Nonzero

Value goes in columns 1 and 2  
i.e., 07, 21.

8. Format (E15.8,5X,F4.1)

Values of the Transmission Coefficient in columns 1-15  
Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 is the value of L  
i.e., +0.1000000E+00bbbL=15.0

9. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 03.000

1-9 constitutes the data required to perform a Type 6 Calculation provided only one particle is emitted. If more than one particle is desired, additional data must be prepared for each particle emission.

10. Format (I2)

Number of Transmission Coefficients to be used in Computations

Must be Nonzero

Value goes in columns 1 and 2  
i.e., 07, 21.

11. Format (E15.8,5X,F4.1)

Values of the Transmission Coefficient in columns 1-15  
Columns 16-18 are blank

Column 19 is an L

Column 20 is an equal sign (=)

Column 21-24 is the value of L  
i.e., +0.1000000E+00bbbL=15.0

## 12. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 03.000

For each additional particle emitted, the program requires 10, 11, 12 be added. Thus, to perform a Type 6 Calculation with the emission of 3 particles, the data needed would be:

- (1 - 9) Gives the Compound Nucleus followed by the Emission of Particle 1
- (10-12) Gives the Emission of Particle 2
- (10-12) Gives the Emission of Particle 3

## 13. Format (I2)

Number of Gamma Rays to be emitted - NGE  
Must be Nonzero  
NGE goes in columns 1 and 2  
i.e., for 3 gamma rays to be emitted 03

## 14. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 05.000

## 15. Format (I2)

Multipolarity of Gamma-ray Emission - L  
L goes in columns 1 and 2  
i.e., 01, 02.

1-15 constitutes all of the data required to perform the Type 6 calculations for a single gamma-ray emission. If more than one gamma-ray emission is desired, additional data must be prepared for each emission.

## 16. Format (F6.3)

Value of Sigma goes in columns 1-6  
i.e., 05.000

## 17. Format (I2)

Multipolarity of Gamma-ray Emission - L  
L goes in columns 1 and 2  
i.e. 01, 02.

Thus, to perform a Type 6 calculation with the emission of 3 gamma rays,  
the data required are:

- (1 - 15) Gives emission of gamma ray 1
- (16, 17) Gives emission of gamma ray 2
- (16, 17) Gives emission of gamma ray 3

## VIII. PROGRAM LISTING

```

C      NORMALIZED SPIN DISTRIBUTIONS IN NUCLEAR REACTIONS
DIMENSION TL(200),PJC(200),PJF(200),CS(200)
2 , RHO(200),FJI(200),FJFS(200)
EQUIVALENCE (RHO,TL),(FJI,PJF),(PJC,FJFS)
1001 DC 101 I=1,200
      TL(I)=0.0
      CS(I)=0.
      PJF(I)=0.
      RHO(I)=0.
      FJI(I)=0.
      FJFS(I)=0.
101 PJC(I)=0.0
22222 KTAPE=6
100 READ 109
109 FFORMAT(72H
      )
      READ 99,MPD
      GC TC(1100,1000,9001,1100,1000,1100),MPD
C      NORMALIZED SPIN DISTRIBUTION FOR INITIAL COMPOUND NUCLEUS
C
1100 READ 1, TSPIN,PSPIN,PORPC,NTL
      1 FFORMAT (3E15.8, 13)
      DC 33 I=1,NTL
      35 READ 990,TL(I),CL
      WRITE OUTPUT TAPE KTAPE,1111
      1111 FFORMAT(1H1,15X,58HNORMALIZED INITIAL COMPOUND NUCLEUS SPIN DI
      1STRIBUTION,/ /)
      WRITE OUTPUT TAPE KTAPE, 109
      WRITE OUTPUT TAPE KTAPE, 200,TSPIN
200 FFORMAT(1H0,10X,22HINPUT TARGET SPIN WAS F6.3)
      WRITE OUTPUT TAPE KTAPE, 201,PSPIN
201 FFORMAT(1H0,10X,26HINPUT PROJECTILE SPIN WAS F6.3)
      WRITE OUTPUT TAPE KTAPE, 202,PORPC
202 FFORMAT(1H0,10X,29HPROPORTIONALITY CCNSTANT WAS F6.3)
      FJMAX=TSPIN+PSPIN+CL
      WRITE OUTPUT TAPE KTAPE, 112,FJMAX
      112 FFORMAT(1H0,10X,39HJCMAX=LMAX*TARGET SPIN+PROJECTILE SPIN=F4.1)
      C=(2.*PSPIN+1.)*(2.*TSPIN+1.)
      SUL=ABSF(TSPIN+PSPIN)
      SLL=ABSF(TSPIN-PSPIN)
      JFMAX=FJMAX
      FJMAX1=FJMAX
      IF(FJMAX-FJMAX1)88,44,45
44 FJ=0.0
      FJI=0.0
      NCOE=FJMAX+1.
303 WRITE OUTPUT TAPE KTAPE, 203,NTL
203 FFORMAT(1H0,10X,27HOUTPUT WILL BE INTEGER FOR I2,19H INPLT VALUES O
      1F TL,/ )
      GC TC 46
45 FJ=0.5
      FJI=0.5
      NCCF=FJMAX+.5
      WRITE OUTPUT TAPE KTAPE, 204,NTL
204 FFORMAT(1H0,10X,32HOUTPUT WILL BE HALF-INTEGER FOR I2,19H INPUT VAL
      UES OF TL,/ )
46 K=1
47 S=SLL
16 SU=ABSF(FJ+S)
      SL=ABSF(FJ-S)

```

```

SL=SL+1.
SU=SU+1.
TLNDX=SL
SUM=0.0
48 I=TLNDX
IF(TL(I))148,49,148
148 SUM=SUM+((2.*FJ+1.)/C)*TL(I)
IF(TLNDX-SU)17,49,49
17 TLNDX=TLNDX+1.
GO TO 48
49 CS(K)=CS(K)+SLM*PORPC
S=S+1.
IF(S-SUL)16,16,50
50 IF(FJ-FJMAX)51,52,52
51 FJ=FJ+1.
K=K+1
GO TO 47
52 SUMJC=0.0
DO 53 I=1,200
53 SUMJC=SUMJC+CS(I)
SUMJ=0.0
FJ1=FJ1
DO 54 I=1,200
PJC(I)=CS(I)/SUMJC
FJ2=FJ1*FJ1
SUMJ=SUMJ+PJC(I)*FJ2
54 FJ1=FJ1+1.
FJ1=FJ1
SUM=0.0
WRITE OUTPUT TAPE KTAPE,1113
1113 FORMAT(1H0,3H L,15X,2HTL,13X,2HJC,5X,13HCROSS SECTION,12X,3HPJC,1
14X,9HSUM PJC,10X,13H(JC)(JC) AVE.///)
FJIX=0.0
SUM=SUM+PJC(1)
WRITE OUTPUT TAPE KTAPE,1114,FJIX,TL(I),FJ1,CS(I),PJC(I),SUM,SUMJ
1114 FORMAT(1H ,1X,F4.1,5X,E15.8,5X,F4.1,4(5X,E15.8))
DO 14 I=2,NTL
FJIX=FJIX+1.
FJ1=FJ1+1.
SUM=SUM+PJC(I)
14 WRITE OUTPUT TAPE KTAPE,1115,FJIX,TL(I),FJ1,CS(I),PJC(I),SUM
1115 FCRMAT(1H ,1X,F4.1,5X,E15.8,5X,F4.1,3(5X,E15.8))
I=NTL+1
FJ1=FJ1+1.
15 IF(FJ1-FJMAX)412,412,411
412 SUM=SUM+PJC(I)
WRITE OUTPUT TAPE KTAPE,1116,FJ1,CS(I),PJC(I),SUM
WRITE OUTPUT TAPE 6,1116,FJ1,CS(I),PJC(I),SUM
1116 FCRMAT(1H ,30X,F4.1,3(5X,E15.8))
I=I+
FJ1=FJ1+1.
GO TO 15
411 GC TO(1001,88,88,1200, 88 ,1200),MPD
C
C      NORMALIZED SPIN DISTRIBUTION FOLLOWING PARTICLE EMISSION
C
1200 NPE1=1
CJC=FJMAX
NJC=NCOE
DC 1301 I=1,200
TL(I)=0.
CS(I)=0.

```

```

1301 PJF(I)=0.
    READ 99,NPE
    GOTO 808
1000 READ 99,NPE
111 FORMAT(F6.3)
889 READ 99,NJC
99 FORMAT(I2)
DC2I=1,NJC
2 READ 99C,PJC(I),CJC
NPE1=1
808 READ 111,SP
888 READ 99,NTL
DO 31 I=1,NTL
31 READ 99C,TL(I),CL
990 FORMAT(E15.8,5X,F4.1)
893 READ 111,SIGMA
FJMAX=CL+CJC+SP
CJMAX=CJC
L=1
SUM=0.
B1=0.
WRITE OUTPUT TAPE KTAPE, 113
113 FORMAT(1H1,15X,56HNORMALIZED SPIN DISTRIBUTION FOLLOWING PARTICLE
IEMISSION//)
WRITE OUTPUT TAPE KTAPE, 109
WRITE OUTPUT TAPE KTAPE, 89C,NPE1
890 FORMAT(1H0,30X,33HDISTRIBUTION FOR PARTICLE NO. 12,/1)
WRITE OUTPUT TAPE KTAPE, 114,SIGMA
WRITE OUTPUT TAPE KTAPE, 11E,SP
114 FORMAT(1H0,24X,19HINPUT SIGMA WAS E15.8)
WRITE OUTPUT TAPE 6, 118, SP
118 FORMAT(1H0,24X,25HOUTGOING PARTICLE SPIN=F6.4)
WRITE OUTPUT TAPE KTAPE, 115,FJMAX
115 FORMAT(1H0,24X,25HJFMAX=LMAX+JCMAX+S PRIME=F7.4)
JMAX=FJMAX
FJMAX1=JMAX
IF(FJMAX-FJMAX1)88,3,4
3 FJI=0 .
CJI=0.5
CJ=.5
FJ=0 .
FJII=0 .
NCOL=FJMAX+1.
WRITE OUTPUT TAPE KTAPE, 116,NTL
116 FORMAT(1H0,24X,31HOUTPUT WILL BE INTEGER FOR I2,22H INPUT VAL
1UES CF TL,/1)
GC TC 55
4 FJI=.5
CJI=0 .
CJ=0 .
FJ=.5
FJII=0.5
NCOL=FJMAX+.5
WRITE OUTPUT TAPE KTAPE, 117,NTL
117 FORMAT(1H0,24X,36HOUTPUT WILL BE HALF-INTEGER FOR I2,22H INPUT
1 VALUES OF TL,/1)
55 FJN=FJ
FCT=FJN+CL+SP
FCL=FJN-CL-SP
IF(FCL)666,667,667
666 CJ=CJI
GC TC 668

```

```

667 CJ=FCL
668 IF(CJMAX-FCT) 2667,2667,2668
2667 FCT=CJMAX
GO TO 2668
2668 K=CJ+1.
NOD=1
5 SUMTL=0.0
SU=ABSF(FJN+SP)
SL=ABSF(FJN-SP)
S=SL
11 UL=ABSF(CJ+S)+1.
BL=ABSF(CJ-S)+1.
TCX=BL
110 I=TDX
IF(TL(I))87,7,87
87 SUMTL=SUMTL+TL(I)
IF(TDX-UL)6,7,7
6 TDX=TDX+1.
GO TO 110
7 IF(S-SU)8,9,9
8 S=S+1.
GO TO 11
9 GO TO (669,665),NOD
669 FJN=FJ
665 ARG=-((FJN+.5)**2.)/(2.*SIGMA*SIGMA)
TEMP= (SUMTL*EXP(FARG))*(2.*FJN+1.)
GCTC(551,552),NOD
551 T=TEMP
NCD=2
FJT=CJ+CL+SP
FJL=CJ-CL-SP
IF(FJL)461,462,462
461 FJN=FJI
GCTC 5
462 FJN=FJL
GCTC 5
552 B1=B1+TEMP
IF(FJN-FJT)557,558,558
557 FJN=FJN+1.
GO TO 5
558 IF(B1) 1558,1559,1558
1558 CS(L)=CS(L)+(T/B1)*PJC(K)
1559 B1=0.
IF(FCT-CJ)560,560,559
559 K=K+1
10 CJ=CJ+1.
NOD=1
FJN=FJ
GO TO 5
560 SUM=SUM+CS(L)
IF(FJMAX-FJ)570,570,561
561 L=L+1
FJ=FJ+1.
13 CJ=CJI
GO TO 55
570 FJ=FJI
AVE=0.
DC 77 I=1,L
PJF(I)=CS(I)/SUM
AVE=PJF(I)*FJ*FJ+AVE
77 FJ=FJ+1.
SUM=C.

```

```

I=1
FJ=FJII
CJ=CJI
WRITE OUTPUT TAPE KTAPE, 401
401 FORMAT(1H0,2H L,13X,2HTL,11X,2HJC,11X,3HPJC,12X,2HJF,11X,3HPJF,13X
1,9HSUM PJF, 9X,13H(JF)(JF) AVE.)
AI=I-1
SUM=SUM+PJF(I)
WRITE OUTPUT TAPE KTAPE, 402,AI,TL(1),CJ,PJC(1),FJ,PJF(1),SUM,AVE
402 FORMAT(1H0,F4.1,4X,E15.8,4X,F4.1,4X,E15.8,4X,F4.1,3(4X,E15.8))
DC 66 I=2,NTL
CJ=CJ+1.
FJ=FJ+1.
SUM=SUM+PJF(I)
AI=I-1
66 WRITE OUTPUT TAPE KTAPE, 403,AI,TL(I),CJ,PJC(I),FJ,PJF(I),SUM
403 FORMAT(1H ,F4.1,4X,E15.8,4X,F4.1,4X,E15.8,4X,F4.1, 2(4X,E15.8))
N=I
DC 67 I=N,NJC
FJ=FJ+1.
CJ=CJ+1.
SLM=SUM+PJF(I)
67 WRITE OUTPUT TAPE KTAPE, 404,CJ,PJC(I),FJ,PJF(I),SUM
404 FORMAT(1H ,27X,F4.1,4X,E15.8,4X,F4.1,2(4X,E15.8))
I=NJC+1
1462 FJ=FJ+1.
IF(FJ-FJMAX)413,413,414
413 SUM=SUM+PJF(I)
68 WRITE OUTPUT TAPE KTAPE, 405,FJ,PJF(I),SUM
405 FORMAT(1H ,54X,F4.1,2(4X,E15.8))
I=I+1
GC TO1462
414 IF(NPE-NPE1)891,891,892
892 NPE1=NPE1+1
CJC=FJMAX
NJC=NCCE
DC 894 I=1,200
TL(I)=0.
CS(I)=0.
PJC(I)=PJF(I)
894 PJF(I)=0.
GC TO 888
891 GC TC(88,1001,88,1001,900C,9CC0),MPD
88 STOP
C
C      NORMALIZED SPIN DISTRIBUTION FOLLOWING GAMMA-RAY EMISSION
C
9000 NFJI=NOCE
CJ1=FJMAX
DC 246 I=1,200
FJFS(I)=0.
RHO(I)=C.
246 FJ1(I)=PJF(I)
GC TO 9002
9001 READ 99,NFJI
DC 142 I=1,NFJI
142 READ 99C,FJI(I),CJI
9002 NGC=1
READ 99,NGE
98 READ 111,SIGMA
READ 99,L
WRITE OUTPUT TAPE KTAPE, 776,NGC

```

```

776 FORMAT(1H1,24X,72HNORMALIZED SPIN DISTRIBUTION FOLLOWING EMISS
1CN OF GAMMA RAY NO. I2,/)
WRITE OUTPUT TAPE KTAPE, 109
WRITE OUTPUT TAPE KTAPE, 77E,SIGMA
778 FORMAT(1H0,24X,24HSPIN CUT OFF FACTOR = F6.3)
CL=L
WRITE OUTPUT TAPE KTAPE, 775,L
775 FORMAT(1H0,24X,39HMULTIPOLARITY OF GAMMA-RAY EMISSION I2)
FJMAX=CL+CJI
WRITE OUTPUT TAPE KTAPE, 777E,FJMAX
7779 FORMAT(1H0,24X, 18HFJ(MAX)=JI(MAX)+L=F6.3)
J=CJI
CJ=J
I=0
IF(CJI-CJ)133,134,133
133 FJ1=.5
GO TO 155
134 FJ1=C.
155 FJ=FJ1
255 I=I+1
ARG=-((FJ+.5)**2.)/(2.*SIGMA*SIGMA)
RHO(I)=(2.*FJ+1.)*EXP(ARG)
FJ=FJ+1.
IF(FJ-FJMAX-2.*CL)255,255,256
256 FJS=FJ1
J=1
372 ULL=FJS+CL
BLL=ABSF(FJS-CL)
CJ=BLL
IF(FJ1)88,1813,1812
1813 JI=CJ
GO TO 375
1812 JI=CJ-.5
375 FML=CJ+CL
FLL=ABSF(CJ-CL)
CI=FLL
IF(FJ1)88,1814,1815
1814 I=CI
GO TO 1816
1815 I=CI-.5
1816 SUM=0.0
370 SUM=SUM+RHO(I+1)
I=I+1
CI=CI+1.
IF(FML-CI)371,370,370
371 IF(SUM) 1371,1372,1371
1371 FJFS(J)=FJFS(J)+(FJI(JI+1)*RHO(J)) /SUM)
1372 CJ=CJ+1 .
JI=JI+1
IF(ULL-CJ)373,375,375
373 J=J+1
FJS=FJS+1.
IF(FJMAX-FJS)374,372,372
374 FJ=FJ1
FSUM=0.
AVE=0.
DC 222 I=1,J
AVE=FJ*FJ*FJFS(I) +AVE
222 FJ=FJ+1.
JJ=FJMAX+1.
I=1
SUM=0.

```

```

      WRITE OUTPUT TAPE KTAPE, 78C
780 FORMAT(1H0,5X,2HJI,13X,3HJF1,17X,2HJF,13X,3HFJF,17X,9HSLM   FJF,12
1X,13H(JF)(JF) AVE.)
SUM=SUM+FJFS(I)
FJ=FJ1
      WRITE OUTPUT TAPE KTAPE, 781,FJ,FJI(I),FJ,FJFS(I),SUM,AVE
781 FORMAT(1H0,4X,F4.1,7X,E15.8,9X,F4.1,3(7X,E15.8))
IF(NFJI-1) 88,1264,1263
1263 DC 263 I=2,NFJI
FJ=FJ+1.
SUM=SUM+FJFS(I)
263 WRITE OUTPUT TAPE KTAPE, 782,FJ,FJI(I),FJ,FJFS(I),SUM
782 FORMAT(1H , 4X,F4.1,7X,E15.8,9X,F4.1,2(7X,E15.8))
1264 FJ=FJ+1.
I=NFJI+1
150 SUM=SUM+FJFS(I)
      WRITE OUTPUT TAPE KTAPE, 783,FJ,FJFS(I),SUM
783 FORMAT(1H , 39X,F4.1,2(7X,E15.8) )
I=I+1
FJ=FJ+1.
IF(FJMAX-FJ)140,150,150
140 NGE=NGE-1
NGC=NGC+1
IF(NGE-1) 19,18,18
18 DC 166 I=1,200
FJI(I)=FJFS(I)
RFO(I)=0.
166 FJFS(I)=0.
NFJI=NFJI+L
CJI=FJMAX
GC TC 98
19 GC TC 1C01

      END(0,1,0,0,1)

```

## EXTERNAL FORMULA NUMBERS WITH CORRESPONDING INTERNAL FORMULA NUMBERS AND OCTAL LOCATIONS

EFN	IFN	LCC	EFN	IFN	LOC	EFN	IFN	LOC	EFN	IFN	LOC	EFN	IFN	LOC
1001	3	C0013	101	10	00030	22222	11	C0034	100	12	00036	100	13	00045
109	14	00000	1100	19	00073	1100	21	C0110	1	22	00000	33	24	00115
33	26	00130	1111	30	00000	200	38	00000	201	43	00000	202	48	00000
112	54	00000	44	61	00322	303	64	00336	303	67	00352	203	68	00000
45	70	00355	204	77	00000	46	78	C0407	47	79	00413	16	80	00416
48	86	00440	148	88	00453	17	90	C0466	49	92	00472	50	95	00506
51	96	00513	52	99	00524	53	101	C0527	54	108	00553	1113	114	00000
1114	121	C0000	14	126	00644	14	129	00665	1115	130	00000	15	133	00700
412	134	00704	1116	142	00000	411	146	00760	1200	147	00767	1301	153	01002
1000	158	01023	1000	160	01035	111	161	00000	889	162	01037	889	164	01051
99	165	C0000	2	167	01056	2	169	C0171	808	171	01101	808	173	01113
888	174	01117	888	176	01131	31	178	C0136	31	180	01151	990	181	00000
893	182	01155	893	184	01167	113	193	00000	890	201	00000	114	210	00000
118	214	00000	115	219	00000	3	223	C1362	116	233	00000	4	235	01423
117	245	00000	55	246	01466	666	250	C1503	667	252	01506	668	253	01510
2667	254	C1514	2668	256	01517	5	258	01536	11	262	01552	110	265	01566
87	267	01602	6	269	01612	7	271	01616	8	272	01624	9	274	01630
669	275	01634	665	276	01636	551	279	C1703	461	284	01725	462	286	01730
552	288	01735	557	290	01744	558	292	C1750	1558	293	01752	1559	294	01764
559	296	C1773	10	297	02000	560	301	C2012	561	303	02022	13	305	02032
570	307	02035	77	312	02056	401	320	00000	402	327	00000	66	333	02171
66	336	02213	403	337	00000	67	343	C2236	67	346	02256	404	347	00000
1462	349	02266	413	351	02275	68	352	02300	68	355	02316	405	356	00000
414	359	02326	892	360	02333	894	367	C2351	891	369	02357	88	370	02374
9000	371	02376	246	376	02407	9001	378	C2414	9001	380	02426	142	382	02433
142	384	02446	9002	385	02452	98	389	C2473	98	391	02505	776	399	00000
778	407	00000	775	413	00000	7779	419	00000	133	424	02664	134	426	02670
155	427	02672	255	428	02674	256	433	C2754	372	435	02763	1813	439	03001
1812	441	03013	375	442	03025	1814	446	C3042	1815	448	03055	1816	449	03067
370	450	03074	371	454	03113	1371	455	C3115	1372	456	03125	373	459	03141
374	462	03155	222	467	03175	780	474	00000	781	481	00000	1263	483	03270
263	486	03301	263	489	03321	782	490	00000	1264	491	03325	150	493	03336
783	498	00000	140	502	03374	18	505	C3407	166	508	03414	19	512	03427

STORAGE NOT USED BY PROGRAM

DEC	OCT	DEC	OCT
3026	05722	32562	77462

LOCATIONS OF NAMES IN TRANSFER VECTOR

DEC	CCT	DEC	OCT	DEC	OCT	DEC	OCT	DEC	OCT					
EXP(3 (ICH)C	1 4	00001 00004	EXP (LEV)	0 8	00000 00010	(CSH) (RTN)	6 5	00006 00005	(FIL) (STH)	2 3	00002 00003	(IOH)I	7	00007

## STORAGE LOCATIONS FOR VARIABLES APPEARING IN DIMENSION AND EQUIVALENCE SENTENCES

	DEC	CCT		DEC	OCT		DEC	OCT		DEC	OCT			
FJI	2825	05411		FJFS	2625	05101		CS	2425	04571		PJC	2625	05101
RHC	3025	05721		TL	3025	05721						PJF	2825	05411

## STORAGE LOCATIONS FOR VARIABLES NOT APPEARING IN DIMENSION, EQUIVALENCE OR COMMON SENTENCES

	DEC	CCT		DEC	OCT		DEC	OCT		DEC	OCT			
I	2225	04261		FSUM	2224	04260		FML	2223	C4257		FLL	2222	04256
FJS	2220	04254		FJ	2219	04253		FJN	2218	C4252		FJMAX	2217	04251
FJL	2215	04247		FJIX	2214	04246		FJIN	2213	C4245		FJ2	2212	04244
FCT	2210	04242		FCL	2209	04241		C	2208	C4240		CL	2207	04237
CJMAX	2205	04235		CJI	2204	04234		CJC	2203	C4233		CI	2202	04232
BLL	2200	04230		B1	2199	04227		AVE	2198	C4226		ARG	2197	04225
JFMAX	2195	04223		JI	2194	04222		JJ	2193	C4221		JMAX	2192	04220
K	2190	04216		KTAPE	2189	04215		L	2188	C4214		MPD	2187	04213
NGC	2185	04211		NGE	2184	04210		NJC	2183	C4207		NDC	2182	04206
NPE1	2180	04204		NPE	2179	04203		N	2178	C4202		NTL	2177	04201
PSPIN	2175	04177		SIGMA	2174	04176		SLL	2173	C4175		SL	2172	04174
S	2170	04172		SUL	2169	04171		SUMJC	2168	C4170		SLMJ	2167	04167
SUMTL	2165	04165		SU	2164	04164		TDX	2163	C4163		TEMP	2162	04162
T	2160	04160		TSPIN	2159	04157		ULL	2158	C4156		UL	2157	04155

## STORAGE LOCATIONS FOR SYMBOLS NOT APPEARING IN SOURCE PROGRAM

	DEC	CCT		DEC	OCT		DEC	OCT		DEC	OCT			
E172G	1272	C2370		E162G	1270	02366		E13M	1814	C3426		E13T	1757	03335
E158	1619	03123		E135	1594	03072		E133	1579	C3053		E12Y	1536	03000
E12B	1237	02325		E11Q	987	01733		E110	979	C1723		E11L	922	01632
E11G	896	01600		E1Q	495	00757		E1G	330	C0512		E1C	298	00452
D1411	576	01100		D140A	269	00415		D140C	10	00012		D1320	1337	02471
D131U	1010	01762		D1317	E20	01464		D122C	1338	C2472		D122G	1275	02373
D121H	905	01611		D1217	E21	01465		D112U	1522	C2762		D112F	1262	02356
D1112	590	01116		C1G7	2156	04154		C1G6	2155	C4153		C1G5	2154	04152
C1G2	2152	C4150		C1G1	2151	04147		C1G0	2150	C4146		817J3	1867	03513
8112R	2034	C3762		8112Q	2641	03771		8112P	2058	04012		8112N	2128	04120
810RQ	2005	03725		810F	1833	03451		810E	1840	C3460		810E	1847	03467
810CA	1883	03533		8108	1899	03553		8107	1876	C3524		810L	1904	03560
810CJ	1922	C3602		810CI	1932	03614		810H	1948	C3634		810C	2070	04026
8106A	2100	04064		8169	2108	04074		8168	2115	C4103		816B	2082	04042
8103K	1975	03667		813J	1982	03676		813I	1996	03714		813T	2017	03741
8103F	2022	03746		813D	2144	04140		8133	2021	03745		811	2131	04123
2)	1816	03430	3)		1820	03434	6)		1824	C3440	7)		2145	04141

## SUBROUTINES PUNCHED FROM LIBRARY

LOG (ICH)C	EXP (ICH)I	EXP(3)	(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
00000	EXP	BCD 1EXP	00072	TRA 158A		00164	CAL KTAPE		
00001	EXP(3)	BCD 1EXP(3	00073 19A	CAL *		00165	STD 35D1		
00002	(FIL)	BCD 1(FIL)	00074	XIT (LEV)		00166 35A	ETM		
00003	(STH)	BCD 1(STH)	00075	ETM		00167	CAL (IOH)O		
00004	(IOH)O	BCD 1(IOH)O	00076	CAL (ICH)I		00170	SLW 1		
00005	(RTN)	BCD 1(RTN)	00077	SLW 1		00171	CAL (STH)		
00006	(CSH)	BCD 1(CSH)	00100	CAL (CSH)		00172 35C1	NTR 8)68		
00007	(IOH)I	BCD 1(IOH)I	00101 19D1	NTR 8)1,0,81		00173 36A	ETM		
00010	(LEV)	BCD 1(LEV)	00102 20A	ETM		00174	NTR TSPIN		
00011	D)600	LXD C)G2,2	00103	NTR TSPIN		00175	LTM		
00012	D)400	LXD C)G4,4	00104	NTR PSPIN		00176 37A	CAL *		
00013	3A	LXD 2)+1,1	00105	NTR PORPC		00177	XIT (FIL)		
00014	4A	CLA 3)	00106	NTR NTL		00200 39A	CAL *		
00015	STO TL+1,1		00107	LTM		00201	XIT (LEV)		
00016	5A	CLA 3)	00110 21A	CAL *		00202	CAL KTAPE		
00017	STO CS+1,1		00111	XIT (RTN)		00203	STD 40D1		
00020	6A	CLA 3)	00112 23A	LXD 2)+1,4		00204 40A	ETM		
00021	STO PJF+1,1		00113	CLA NTL		00205	CAL (IOH)O		
00022	7A	CLA 3)	00114	STD 26A2		00206	SLW 1		
00023	STO RHC+1,1		00115 24A	CAL *		00207	CAL (STH)		
00024	8A	CLA 3)	00116	XIT (LEV)		00210 40C1	NTR 8)69		
00025	STO FJ+1,1		00117	ETM		00211 41A	ETM		
00026	9A	CLA 3)	00120	CAL (ICH)I		00212	NTR PSPIN		
00027	STO FJFS+1,1		00121	SLW 1		00213	LTM		
00030	10A	CLA 3)	00122	CAL (CSH)		00214 42A	CAL *		
00031	STO PJC+1,1		00123 24D1	NTR 8)UU,0,81		00215	XIT (FIL)		
00032	1CA1	TXI *+1,1,1	00124 25A	ETM		00216 44A	CAL *		
00033	1CA2	TXL 4A,1,200	00125	NTR TL+1,4		00217	XIT (LEV)		
00034	11A	CLA 2)	00126	NTR CL		00220	CAL KTAPE		
00035	STO KTAPE		00127	LTM		00221	STD 45D1		
00036	12A	CAL *	00130 26A	CAL *		00222 45A	ETM		
00037	XIT (LEV)		00131	XIT (RTN)		00223	CAL (IOH)O		
00040	ETM		00132 26A1	TXI *+1,4,1		00224	SLW 1		
00041	CAL (IOH)I		00133 26A2	TXL 24A,4		00225	CAL (STH)		
00042	SLW 1		00134 27A	CAL *		00226 45C1	NTR 8)6A		
00043	CAL (CSH)		00135	XIT (LEV)		00227 46A	ETM		
00044	12D1	NTR 8)3D,0,81	00136	CAL KTAPE		00230	NTR PORPC		
00045	13A	CAL *	00137	STD 28C1		00231	LTM		
00046	XIT (RTN)		00140 28A	ETM		00232 47A	CAL *		
00047	15A	CAL *	00141	CAL (IOH)O		00233	XIT (FIL)		
00050	XIT (LEV)		00142	SLW 1		00234 49A	CLA TSPIN		
00051	ETM		00143	CAL (STH)		00235	FAD PSPIN		
00052	CAL (IOH)I		00144 28D1	NTR 8)12N		00236	FAD CL		
00053	SLW 1		00145 29A	CAL *		00237	STO FJMAX		
00054	CAL (CSH)		00146	XIT (FIL)		00240 50A	CAL *		
00055	15D1	NTR 8)33,0,81	00147 31A	CAL *		00241	XIT (LEV)		

		SUBROUTINES PUNCHED FROM LIBRARY							
LOG (IOH)C	EXP (IOH)I	EXP(3)	(RTN)	(LEV)	(STH)	(CSH)	(F1L)	(BDC)	(DBC)
00056	16A	ETM	00150	XIT (LEV)		00242	CAL KTAPE		
00057		NTR MPC	00151	CAL KTAPE		00243	STD 51D1		
00060		LTM	00152	STD 32C1		00244	51A	ETM	
00061		LXD MPC,1	00153	32A	ETM	00245		CAL (IOH)0	
00062		SXD C)G1,1	00154	CAL (IOH)0		00246	SLW 1		
00063	17A	CAL *	00155	SLW 1		00247		CAL (STH)	
00064		XIT (RTN)	00156	CAL (STH)		00250	51D1	NTR 8)3G	
00065	18A	TRA 18A+7,1	00157	32D1	NTR 8)3D	00251	52A	ETM	
00066		TRA 19A	00160	33A	CAL *	00252		NTR FJMAX	
00067		TRA 158A	00161	XIT (FIL)		00253		LTM	
00070		TRA 19A	00162	34A	CAL *	00254	53A	CAL *	
00071		TRA 378A	00163	XIT (LEV)		00255		XIT (FIL)	
00256	55A	LDQ 3)+1	00350	NTR NTL		00442		LRS	
00257		FMP TSPIN	00351	LTM		00443		ANA 6)+1	
00260		FAD 3)+2	00352	67A	CAL *	00444		LLS	
00261		STO 1)+1	00353	XIT (FIL)		00445		ALS 18	
00262		LDQ 3)+1	00354	69A	TRA 78A	00446		STO I	
00263		FMP PSPIN	00355	70A	CLA 3)+3	00447		LXD I,4	
00264		FAD 3)+2	00356	STC FJ		00450	87A	CLA TL+1,4	
00265		STO 1)+2	00357	71A	CLA 3)+3	00451	87A1	TZE 92A	
00266		LDQ 1)+2	00360	STO FJI		00452	E1C	SXD C)G0,4	
00267		FMP 1)+1	00361	72A	CLA FJMAX	00453	88A	LDQ 3)+1	
00270		STO C	00362	FAD 3)+3		00454		FMP FJ	
00271	56A	CLA TSPIN	00363	UFA 6)		00455		FAD 3)+2	
00272		FAD PSPIN	00364	LRS		00456		FDP C	
00273		SSP	00365	ANA 6)+1		00457		FMP TL+1,4	
00274		STO SUL	00366	LLS		00460		FAD SUM	
00275	57A	CLA TSPIN	00367	ALS 18		00461		STO SUM	
00276		FSB PSPIN	00370	STO NOCE		00462	89A	CLA TLNDX	
00277		SSP	00371	73A	CAL *	00463		FSB SU	
00300		STO SLL	00372	XIT (LEV)		00464	89A1	TZE 92A	
00301	58A	CLA FJMAX	00373	CAL KTAPE		00465		TPL 92A	
00302		UFA 6)	00374	STD 74C1		00466	90A	CLA TLNDX	
00303		LRS	00375	74A	ETM	00467		FAD 3)+2	
00304		ANA 6)+1	00376	CAL (IOH)0		00470		STO TLNDX	
00305		LLS	00377	SLW 1		00471	91A	TRA 86A	
00306		ALS 18	00400	CAL (STH)		00472	92A	LDQ SUM	
00307		STO FJMAX	00401	74D1	NTR 8)6C	00473		FMP PORPC	
00310	59A	CLA FJMAX	00402	75A	ETM	00474		FAD CS+1,2	
00311		LRS 18	00403	NTR NTL		00475		STO CS+1,2	
00312		CRA 6)	00404	LTM		00476	93A	CLA S	
00313		FAD 6)	00405	76A	CAL *	00477		FAD 3)+2	
00314		STO FJMAX1	00406	XIT (FIL)		00500		STO S	
00315	60A	CLA FJMAX	00407	78A	CLA 2)+1	00501	94A	CLA S	
00316		FSB FJMAX1	00410	STC K		00502		FSB SUL	
00317	60A1	TZE 61A	00411	LXD K,2		00503	94A1	TZE 80A	
00320		TPL 70A	00412	SXD C)G2,2		00504		TPL 95A	
00321		TRA 370A	00413	CLA SLL		00505		TRA 80A	

LOG (IHC)C	EXP (IOH)I	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY						
			(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
00322	61A	CLA 3)	00414	STC S		00506	95A	CLA FJ	
00323		STO FJ	00415	LXD C)G0,4		00507		FSB FJMAX	
00324	62A	CLA 3)	00416	80A	CLA FJ	00510	95A1	TZE 99A	
00325		STO FJI	00417	FAD S		00511		TPL 99A	
00326	63A	CLA FJMAX	00420	SSP		00512	EIG	SXD C)G0,4	
00327		FAD 3)+2	00421	STO SU		00513	96A	CLA FJ	
00330	UFA 6)		00422	81A	CLA FJ	00514		FAD 3)+2	
00331	LRS		00423	FSB S		00515		STO FJ	
00332	ANA 6)+1		00424	SSP		00516	97A	CLA K	
00333	LLS		00425	STO SL		00517		ADD 2)+1	
00334	ALS 18		00426	82A	CLA SL	00520		STO K	
00335	STO NOCE		00427	FAD 3)+2		00521		LXD K,2	
00336	64A	CAL *	00430	STO SL		00522		SXD C)G2,2	
00337	XIT (LEV)		00431	83A	CLA SU	00523	98A	TRA 79A	
00340	CAL KTAPE		00432	FAD 3)+2		00524	99A	CLA 3)	
00341	STD 65C1		00433	STO SU		00525		STO SUMJC	
00342	65A	ETM	00434	84A	CLA SL	00526	10CA	LXD 2)+1,4	
00343		CAL (IHC)O	00435	STO TLNDX		00527	101A	CLA SUMJC	
00344	SLW 1		00436	85A	CLA 3)	00530		FAD CS+1,4	
00345	CAL (STH)		00437	STO SUM		00531		STO SUMJC	
00346	65D1	NTR 8)EB	00440	86A	CLA TLNDX	00532	101A1	TXI *+1,4,1	
00347	66A	ETM	00441	UFA 6)		00533	101A2	TXL 101A,4,200	
00534	102A	CLA 3)	00626	120A	CAL *	00720	137A	ETM	
00535		STO SUMJ	00627	XIT (FIL)		00721		NTR FJ1	
00536	103A	CLA FJI	00630	122A	LXD 2)+2,4	00722		NTR CS+1,4	
00537		STO FJ1	00631	CLA NTI		00723		NTR PJC+1,4	
00540	104A	LXD 2)+1,4	00632	STD 129A2		00724		NTR SUM	
00541	105A	CLA CS+1,4	00633	123A	CLA FJIX	00725		LTM	
00542		FDP SUMJC	00634	FAD 3)+2		00726	138A	CAL *	
00543		STQ PJC+1,4	00635	STO FJIX		00727		XIT (FIL)	
00544	106A	LDQ FJ1	00636	124A	CLA FJ1	00730	139A	CAL *	
00545		FMP FJ1	00637	FAD 3)+2		00731		XIT (LEV)	
00546		STO FJ2	00640	STO FJ1		00732		ETM	
00547	107A	LCQ PJC+1,4	00641	125A	CLA SUM	00733		CAL (IHC)O	
00550		FMP FJ2	00642	FAD PJC+1,4		00734		SLW 1	
00551		FAD SUMJ	00643	STO SUM		00735		CAL (STH)	
00552		STO SUMJ	00644	126A	CAL *	00736	139C1	NTR 8)12S,0,6	
00553	108A	CLA FJ1	00645	XIT (LEV)		00737	140A	ETM	
00554		FAD 3)+2	00646	CAL KTAPE		00740		NTR FJ1	
00555		STO FJ1	00647	STD 127D1		00741		NTR CS+1,4	
00556	108A1	TXI *+1,4,1	00650	127A	ETM	00742		NTR PJC+1,4	
00557	108A2	TXL 105A,4,200	00651	CAL (IHC)O		00743		NTR SUM	
00560	109A	CLA FJI	00652	SLW 1		00744		LTM	
00561		STO FJ1	00653	CAL (STH)		00745	141A	CAL *	
00562	110A	CLA 3)	00654	127D1	NTR 8)12R	00746		XIT (FIL)	
00563		STO SUM	00655	128A	ETM	00747	143A	CLA I	
00564	111A	CAL *	00656	NTR FJIX		00750		ADD 2)+1	

LOG (ICH)C	EXP (ICH)I	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY	(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
00565	XIT (LEV)	00657	NTR TL+1,4				00751	STO I		
00566	CAL KTAPE	00660	NTR FJ1				00752	LXD I,4		
00567	STD 112D1	00661	NTR CS+1,4				00753 144A	CLA FJ1		
00570 112A	ETM	00662	NTR PJC+1,4				00754	FAD 3)+2		
00571	CAL (ICH)0	00663	NTR SUM				00755	STO FJ1		
00572	SLW 1	00664	LTM				00756 145A	TRA 133A		
00573	CAL (STH)	00665 129A	CAL *				00757 E)Q	SXD C)GO,4		
00574 112D1	NTR 8)12P	00666	XIT (FIL)				00760 146A	TRA 146A+7,1		
00575 113A	CAL *	00667 129A1	TXI **1,4,1				00761	TRA 147A		
00576	XIT (FIL)	00670 129A2	TXL 123A,4				00762	TRA 370A		
00577 115A	CLA 3)	00671 131A	CLA NTL				00763	TRA 147A		
00600	STO FJ1X	00672	ADD 2)+1				00764	TRA 370A		
00601 116A	CLA SUM	00673	STC I				00765	TRA 370A		
00602	FAD PJC	00674	LXD I,4				00766	TRA C)400		
00603	STO SUM	00675 132A	CLA FJ1				00767 147A	CLA 2)+1		
00604 117A	CAL *	00676	FAD 3)+2				00770	STO NPE1		
00605	XIT (LEV)	00677	STO FJ1				00771 148A	CLA FJMAX		
00606	CAL KTAPE	00700 133A	CLA FJ1				00772	STO CJC		
00607	STD 118D1	00701	FSB FJMAX				00773 149A	CLA NOCE		
00610 118A	ETM	00702 133A1	TZE 134A				00774	STO NJC		
00611	CAL (ICH)0	00703	TPL E)Q				00775 150A	LXD 2)+1,4		
00612	SLW 1	00704 134A	CLA SUM				00776 151A	CLA 3)		
00613	CAL (STH)	00705	FAD PJC+1,4				00777	STO TL+1,4		
00614 118D1	NTR 8)12Q	00706	STC SUM				01000 152A	CLA 3)		
00615 119A	ETM	00707 135A	CAL *				01001	STO CS+1,4		
00616	NTR FJ1X	00710	XIT (LEV)				01002 153A	CLA 3)		
00617	NTR TL	00711	CAL KTAPE				01003	STO PJF+1,4		
00620	NTR FJ1	00712	STD 136D1				01004 153A1	TXI **1,4,1		
00621	NTR CS	00713 136A	ETM				01005 153A2	TXL 151A,4,200		
00622	NTR PJC	00714	CAL (ICH)0				01006 154A	CAL *		
00623	NTR SUM	00715	SLW 1				01007	XIT (LEV)		
00624	NTR SUMJ	00716	CAL (STH)				01010	ETM		
00625	LTM	00717 136D1	NTR 8)12S				01011	CAL (IOH)I		
01012	SLW 1	01104	CAL (ICH)I				01176	STO CJMAX		
01013	CAL (CSH)	01105	SLW 1				01177 187A	CLA 2)+1		
01014 154C1	NTR 8)33,0,81	01106	CAL (CSH)				01200	STO L		
01015 155A	ETM	01107 171D1	NTR 8)3F,0,81				01201	LXD L,2		
01016	NTR NPE	01110 172A	ETM				01202	SXD C)G5,2		
01017	LTM	01111	NTR SP				01203 188A	CLA 3)		
01020 156A	CAL *	01112	LTM				01204	STO SUM		
01021	XIT (RTN)	01113 173A	CAL *				01205 189A	CLA 3)		
01022 157A	TRA D)411	01114	XIT (RTN)				01206	STO B1		
01023 158A	CAL *	01115	TTR 174A				01207 190A	CAL *		
01024	XIT (LEV)	01116 D)112	LXD C)G1,1				01210	XIT (LEV)		
01025	ETM	01117 174A	CAL *				01211	CAL KTAPE		
01026	CAL (ICH)I	01120	XIT (LEV)				01212	STD 191D1		

LOG (ICH)C	EXP (IOH)I	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY					
			(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)
01027	SLW 1	01121	ETM		01213 191A	ETM		
01030	CAL (CSH)	01122	CAL (IOH)I		01214	CAL (IOH)O		
01031 158D1	NTR 8)33,0,81	01123	SLW 1		01215	SLW 1		
01032 159A	ETM	01124	CAL (CSH)		01216	CAL (STH)		
01033	NTR NPE	01125 174D1	NTR 8)33,0,81		01217 191D1	NTR 8)3H		
01034	LTM	01126 175A	ETM		01220 192A	CAL *		
01035 160A	CAL *	01127	NTR NTL		01221	XIT (FIL)		
01036	XIT (RTN)	01130	LTM		01222 194A	CAL *		
01037 162A	CAL *	01131 176A	CAL *		01223	XIT (LEV)		
01040	XIT (LEV)	01132	XIT (RTN)		01224	CAL KTAPE		
01041	ETM	01133 177A	LXD 2)+1,2		01225	STD 195D1		
01042	CAL (IOH)I	01134	CLA NTL		01226 195A	ETM		
01043	SLW 1	01135	STD 180A2		01227	CAL (IOH)O		
01044	CAL (CSH)	01136 178A	CAL *		01230	SLW 1		
01045 162D1	NTR 8)33,0,81	01137	XIT (LEV)		01231	CAL (STH)		
01046 163A	ETM	01140	ETM		01232 195C1	NTR 8)3D		
01047	NTR NJC	01141	CAL (IOH)I		01233 196A	CAL *		
01050	LTM	01142	SLW 1		01234	XIT (FIL)		
01051 164A	CAL *	01143	CAL (CSH)		01235 197A	CAL *		
01052	XIT (RTN)	01144 178D1	NTR 8)LU,0,81		01236	XIT (LEV)		
01053 166A	LXD 2)+1,2	01145 179A	ETM		01237	CAL KTAPE		
01054	CLA NJC	01146	NTR TL+1,2		01240	STD 198D1		
01055	STD 169A2	01147	NTR CL		01241 198A	ETM		
01056 167A	CAL *	01150	LTM		01242	CAL (IOH)O		
01057	XIT (LEV)	01151 180A	CAL *		01243	SLW 1		
01060	ETM	01152	XIT (RTN)		01244	CAL (STH)		
01061	CAL (IOH)I	01153 180A1	TXI *+1,2,1		01245 198D1	NTR 8)RQ		
01062	SLW 1	01154 180A2	TXI 178A,2		01246 199A	ETM		
01063	CAL (CSH)	01155 182A	CAL *		01247	NTR NPE1		
01064 167D1	NTR 8)LU,0,81	01156	XIT (LEV)		01250	LTM		
01065 168A	ETM	01157	ETM		01251 200A	CAL *		
01066	NTR PJC+1,2	01160	CAL (IOH)I		01252	XIT (FIL)		
01067	NTR CJC	01161	SLW 1		01253 202A	CAL *		
01070	LTM	01162	CAL (CSH)		01254	XIT (LEV)		
01071 169A	CAL *	01163 182D1	NTR 8)3F,0,81		01255	CAL KTAPE		
01072	XIT (RTN)	01164 183A	ETM		01256	STD 203D1		
01073 169A1	TXI *+1,2,1	01165	NTR SIGMA		01257 203A	ETM		
01074 169A2	TXL 167A,2	01166	LTM		01260	CAL (IOH)O		
01075 170A	CLA 2)+1	01167 184A	CAL *		01261	SLW 1		
01076	STO NPE1	01170	XIT (RTN)		01262	CAL (STH)		
01077	TTR 171A	01171 185A	CLA CL		01263 203D1	NTR 8)3I		
01100 D1411	LXD C)64,4	01172	FAD CJC		01264 204A	ETM		
01101 171A	CAL *	01173	FAD SP		01265	NTR SIGMA		
01102	XIT (LEV)	01174	STO FJMAX		01266	LTM		
01103	ETM	01175 186A	CLA CJC		01267 205A	CAL *		

		SUBROUTINES PUNCHED FROM LIBRARY							
LOG (ICH)C	EXP (ICH)I	EXP(3)	(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
01270	XIT (FIL)	01362 223A	CLA 3)		01454	CAL (STH)			
01271 206A	CAL *	01363	STO FJI		01455 242D1	NTR 8)3L			
01272	XIT (LEV)	01364 224A	CLA 3)+3		01456 243A	ETM			
01273	CAL KTAPE	01365	STO CJI		01457	NTR NTI			
01274	STD 207D1	01366 225A	CLA 3)+3		01460	LTM			
01275 207A	ETM	01367	STO CJ		01461 244A	CAL *			
01276	CAL (ICH)0	01370 226A	CLA 3)		01462	XIT (FIL)			
01277	SLW 1	01371	STO FJ		01463	TTR 246A			
01300	CAL (STH)	01372 227A	CLA 3)		01464 D)317	LXD C1G1,1			
01301 207D1	NTR 8)3M	01373	STO FJII		01465 D)217	LXD C1G5,2			
01302 208A	ETM	01374 228A	CLA FJMAX		01466 246A	CLA FJ			
01303	NTR SP	01375	FAD 3)+2		01467	STO FJN			
01304	LTM	01376	UFA 6)		01470 247A	CLA FJN			
01305 209A	CAL *	01377	LRS		01471	FAD CL			
01306	XIT (FIL)	01400	ANA 6)+1		01472	FAD SP			
01307 211A	CAL *	01401	LLS		01473	STO FCT			
01310	XIT (LEV)	01402	ALS 18		01474 248A	CLA FJN			
01311	ETM	01403	STO NOCE		01475	FSB CL			
01312	CAL (ICH)0	01404 229A	CAL *		01476	FSB SP			
01313	SLW 1	01405	XIT (LEV)		01477	STO FCL			
01314	CAL (STH)	01406	CAL KTAPE		01500 249A	CLA FCL			
01315 211D1	NTR 8)3M,0,6	01407	STD 230D1		01501 249A1	TZE 252A			
01316 212A	ETM	01410 230A	ETM		01502	TPL 252A			
01317	NTR SP	01411	CAL (ICH)0		01503 250A	CLA CJI			
01320	LTM	01412	SLW 1		01504	STO CJ			
01321 213A	CAL *	01413	CAL (STH)		01505 251A	TRA 253A			
01322	XIT (FIL)	01414 230D1	NTR 8)3K		01506 252A	CLA FCL			
01323 215A	CAL *	01415 231A	ETM		01507	STO CJ			
01324	XIT (LEV)	01416	NTR NTL		01510 253A	CLA CJMAX			
01325	CAL KTAPE	01417	LTM		01511	FSB FCT			
01326	STD 216D1	01420 232A	CAL *		01512 253A1	TZE 254A			
01327 216A	ETM	01421	XIT (FIL)		01513	TPL 256A			
01330	CAL (ICH)0	01422 234A	TRA 246A		01514 254A	CLA CJMAX			
01331	SLW 1	01423 235A	CLA 3)+3		01515	STO FCT			
01332	CAL (STH)	01424	STO FJI		01516 255A	TRA 256A			
01333 216D1	NTR 8)3J	01425 236A	CLA 3)		01517 256A	CLA CJ			
01334 217A	ETM	01426	STO CJI		01520	FAD 3)+2			
01335	NTR FJMAX	01427 237A	CLA 3)		01521	UFA 6)			
01336	LTM	01430	STO CJ		01522	LRS			
01337 218A	CAL *	01431 238A	CLA 3)+3		01523	ANA 6)+1			
01340	XIT (FIL)	01432	STO FJ		01524	LLS			
01341 220A	CLA FJMAX	01433 239A	CLA 3)+3		01525	ALS 18			
01342	UFA 6)	01434	STO FJII		01526	STO K			
01343	LRS	01435 240A	CLA FJMAX		01527	LXD K,4			
01344	ANA 6)+1	01436	FAD 3)+3		01530	SXD C1G2,4			
01345	LLS	01437	UFA 6)		01531 257A	CLA 21+1			
01346	ALS 18	01440	LRS		01532	STO NOD			

		SUBROUTINES PUNCHED FROM LIBRARY						
LOG (IHC)	EXP (IHC)I	EXP(3) (RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
01347	STO JMAX	01441	ANA 6)+1		01533	LXD NCD,4		
01350 221A	CLA JMAX	01442	LLS		01534	SXD C)G4,4		
01351	LRS 18	01443	ALS 18		01535 D)11D	LXD C)G0,1		
01352	CRA 6)	01444	STO NOCE		01536 258A	CLA 3)		
01353	FAD 6)	01445 241A	CAL *		01537	STO SUMTL		
01354	STO FJMAX1	01446	XIT (LEV)		01540 259A	CLA FJN		
01355 222A	CLA FJMAX	01447	CAL KTAPE		01541	FAD SP		
01356	FSB FJMAX1	01450	STD 242D1		01542	SSP		
01357 222A1	TZE 223A	01451 242A	ETM		01543	STO SU		
01360	TPL 235A	01452	CAL (IHC)0		01544 260A	CLA FJN		
01361	TRA D)122G	01453	SLW 1		01545	FSB SP		
01546	SSP	01640	STO 7)		01732 287A	TRA 258A		
01547	STO SL	01641	LDQ 7)		01733 E)1C	SXD C)G4,4		
01550 261A	CLA SL	01642	FMP SIGMA		01734	SXD C)G0,1		
01551	STO S	01643	STO 1)+1		01735 288A	CLA B1		
01552 262A	CLA CJ	01644	CLA FJN		01736	FAD TEMP		
01553	FAD S	01645	FAD 3)+3		01737	STO B1		
01554	SSP	01646	LDQ 3)+1		01740 289A	CLA FJN		
01555	FAD 3)+2	01647	SDX 6)+4,4		01741	FSB FJT		
01556	STO UL	01650	TSX EXP(3,4		01742 289A1	TZE 292A		
01557 263A	CLA CJ	01651	NTR *+2,0,665		01743	TPL 292A		
01560	FSB S	01652	PZE 0,0,276		01744 290A	CLA FJN		
01561	SSP	01653	LXD 6)+4,4		01745	FAD 3)+2		
01562	FAD 3)+2	01654	FDP 1)+1		01746	STO FJN		
01563	STO BL	01655	STQ 1)+2		01747 291A	TRA 258A		
01564 264A	CLA BL	01656	CLS 1)+2		01750 292A	CLA B1		
01565	STO TDX	01657	STO ARG		01751 292A1	TZE D)31U		
01566 265A	CLA TDX	01660 277A	LDQ 3)+1		01752 293A	CLA T		
01567	UFA 6)	01661	FMP FJN		01753	FDP B1		
01570	LRS	01662	FAD 3)+2		01754	LXD C)G2,2		
01571	ANA 6)+1	01663	STO 1)+1		01755	FMP PJC+1,2		
01572	LLS	01664	CLA ARG		01756	LXD C)G5,1		
01573	ALS 18	01665	SDX 6)+4,4		01757	FAD CS+1,1		
01574	STO I	01666	TSX EXP,4		01760	STO CS+1,1		
01575	LXD I,1	01667	NTR *+2,0,665		01761	TTR 294A		
01576 266A	CLA TL+1,1	01670	PZE 0,0,277		01762 D)31U	LXD C)G5,1		
01577 266A1	TZE 271A	01671	LXD 6)+4,4		01763 D)21U	LXD C)G2,2		
01600 E)1G	SXD C)G4,4	01672	STO 1)+2		01764 294A	CLA 3)		
01601	SXD C)G0,1	01673	LDQ SUMTL		01765	STO B1		
01602 267A	CLA SUMTL	01674	FMP 1)+2		01766 295A	CLA FCT		
01603	FAD TL+1,1	01675	STO 1)+3		01767	FSB CJ		
01604	STO SUMTL	01676	LDQ 1)+3		01770 295A1	TZE 301A		
01605 268A	CLA TDX	01677	FMP 1)+1		01771	TPL 296A		
01606	FSB UL	01700	STO TEMP		01772	TRA 301A		
01607 268A1	TZE 271A	01701 278A	TRA 278A+3,4		01773 296A	CLA K		
01610	TPL 271A	01702	TRA E)1Q		01774	ADD 2)+1		
01611 D)121H	LXD C)G0,2	01703 279A	CLA TEMP		01775	STO K		
01612 269A	CLA TDX	01704	STO T		01776	LXD K,2		

LOG (1CH)C	EXP (1OH)I	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY					(FDC) (DBC)
			(RTN)	(LEV)	(STH)	(CSH)	(FIL)	
01613	FAD 3)+2		01705 280A	CLA 2)+2		01777	SXD C)G2,2	
01614	STO TDX		01706	STO NOD		02000 297A	CLA CJ	
01615 270A	TRA 265A		01707	LXD NOD,4		02001	FAD 3)+2	
01616 271A	CLA S		01710 281A	CLA CJ		02002	STO CJ	
01617	FSB SU		01711	FAD CL		02003 298A	CLA 2)+1	
01620 271A1	TZE 274A		01712	FAD SP		02004	STO NOD	
01621	TPL 274A		01713	STO FJT		02005	LXD NOD,4	
01622 E)1J	SXD C)G4,4		01714 282A	CLA CJ		02006	SXD C)G4,4	
01623	SXD C)G0,1		01715	FSB CL		02007 299A	CLA FJ	
01624 272A	CLA S		01716	FSB SP		02010	STO FJN	
01625	FAC 3)+2		01717	STO FJL		02011 300A	TRA D)11D	
01626	STO S		01720 283A	CLA FJL		02012 301A	CLA SUM	
01627 273A	TRA 262A		01721 283A1	TZE 286A		02013	FAD CS+1,1	
01630 274A	TRA 274A+3,4		01722	TPL 286A		02014	STO SUM	
01631	TRA 276A		01723 E)10	SXD C)G4,4		02015 302A	CLA FJMAX	
01632 E)1L	SXD C)G4,4		01724	SXD C)G0,1		02016	FSB FJ	
01633	SXD C)G0,1		01725 284A	CLA FJI		02017 302A1	TZE 307A	
01634 275A	CLA FJ		01726	STO FJN		02020	TPL 303A	
01635	STO FJN		01727 285A	TRA 258A		02021	TRA 307A	
01636 276A	LDQ SIGMA		01730 286A	CLA FJL		02022 303A	CLA L	
01637	FMP 3)+1		01731	STO FJN		02023	ADD 2)+1	
02024	STO L		02116	FAD PJF+1,1		02210	NTR PJF+1,1	
02025	LXD L,1		02117	STO SUM		02211	NTR SUM	
02026	SXD C)G5,1		02120 323A	CAL *		02212	LTM	
02027 304A	CLA FJ		02121	XIT (LEV)		02213 336A	CAL *	
02030	FAC 3)+2		02122	CAL KTAPE		02214	XIT (FIL)	
02031	STO FJ		02123	STD 324D1		02215 336A1	TXI *+1,1,1	
02032 305A	CLA CJI		02124 324A	ETM		02216	SXD I,1	
02033	STO CJ		02125	CAL (1CH)O		02217 336A2	TXL 329A,1	
02034 306A	TRA D)137		02126	SLW 1		02220 338A	CLA I	
02035 307A	CLA FJI		02127	CAL (SIH)		02221	STO N	
02036	STO FJ		02130 324D1	NTR B)CI		02222 339A	LXD N,1	
02037 308A	CLA 3)		02131 325A	ETM		02223	CLA NJC	
02040	STO AVE		02132	NTR AI		02224	STD 346A2	
02041 309A	LXD 2)+1,1		02133	NTR TL		02225 340A	CLA FJ	
02042	CLA L		02134	NTR CJ		02226	FAD 3)+2	
02043	STD 312A2		02135	NTR PJF		02227	STO FJ	
02044 310A	CLA CS+1,1		02136	NTR FJ		02230 341A	CLA CJ	
02045	FCP SUM		02137	NTR PJF		02231	FAD 3)+2	
02046	STQ PJF+1,1		02140	NTR SUM		02232	STO CJ	
02047 311A	LDQ FJ		02141	NTR AVE		02233 342A	CLA SUM	
02050	FMP PJF+1,1		02142	LTM		02234	FAD PJF+1,1	
02051	STO 7)		02143 326A	CAL *		02235	STO SUM	
02052	LDQ 7)		02144	XIT (FIL)		02236 343A	CAL *	
02053	FMP FJ		02145 328A	LXD 2)+2,1		02237	XIT (LEV)	
02054	FAD AVE		02146	CLA NTL		02240	CAL KTAPE	

SUBROUTINES PUNCHED FROM LIBRARY									
LOG (IOH)C	EXP (IOH)I	EXP(3)	(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
02055	STO AVE	02147	STD 336A2	02241	STD 344D1				
02056 312A	CLA FJ	02150	PXD 0,1	02242	344A	ETM			
02057	FAC 3)+2	02151	STO I	02243		CAL (IOH)O			
02060	STO FJ	02152 329A	CLA CJ	02244	SLW 1				
02061 312A1	TXI *+1,1,1	02153	FAD 3)+2	02245		CAL (STH)			
02062 312A2	TXL 310A,1	02154	STO CJ	02246 344C1	NTR 8)CK				
02063 313A	CLA 3)	02155 330A	CLA FJ	02247 345A	ETM				
02064	STO SUM	02156	FAD 3)+2	02250	NTR CJ				
02065 314A	CLA 2)+1	02157	STO FJ	02251	NTR PJC+1,1				
02066	STO I	02160 331A	CLA SUM	02252	NTR FJ				
02067	LXD I,1	02161	FAD PJF+1,1	02253		NTR PJF+1,1			
02070 315A	CLA FJII	02162	STO SUM	02254	NTR SUM				
02071	STO FJ	02163 332A	CLA I	02255	LTM				
02072 316A	CLA CJI	02164	SUB 2)+1	02256 346A	CAL *				
02073	STO CJ	02165	LRS 18	02257	XIT (FIL)				
02074 317A	CAL *	02166	ORA 6)	02260 346A1	TXI *+1,1,1				
02075	XIT (LEV)	02167	FAD 6)	02261 346A2	TXL 340A,1				
02076	CAL KTAPE	02170	STO AI	02262 348A	CLA NJC				
02077	STD 318D1	02171 333A	CAL *	02263	ADD 2)+1				
02100 318A	ETM	02172	XIT (LEV)	02264	STO I				
02101	CAL (IOH)O	02173	CAL KTAPE	02265	LXD I,1				
02102	SLW 1	02174	STD 334D1	02266 349A	CLA FJ				
02103	CAL (STH)	02175 334A	ETM	02267	FAD 3)+2				
02104 318D1	NTR 8)CH	02176	CAL (IOH)O	02270	STO FJ				
02105 319A	CAL *	02177	SLW 1	02271 350A	CLA FJ				
02106	XIT (FIL)	02200	CAL (STH)	02272	FSB FJMAX				
02107 321A	CLA I	02201 334D1	NTR 8)CJ	02273 350A1	TZE 351A				
02110	SUB 2)+1	02202 335A	ETM	02274	TPL E12B				
02111	LRS 18	02203	NTR AI	02275 351A	CLA SUM				
02112	ORA 6)	02204	NTR TL+1,1	02276	FAD PJF+1,1				
02113	FAD 6)	02205	NTR CJ	02277	STO SUM				
02114	STO AI	02206	NTR PJC+1,1	02300 352A	CAL *				
02115 322A	CLA SUM	02207	NTR FJ	02301	XIT (LEV)				
02302	CAL KTAPE	02374 370A	HPR	02466 388A	CAL *				
02303	STD 353D1	02375	TRA 370A	02467	XIT (RTN)				
02304 353A	ETM	02376 371A	CLA NCCE	02470	TTR 389A				
02305	CAL (IOH)O	02377	STO NFJI	02471 D1320	LXD C)G1,1				
02306	SLW 1	02400 372A	CLA FJMAX	02472 D1220	LXD C)G2,2				
02307	CAL (STH)	02401	STO CJI	02473 389A	CAL *				
02310 353D1	NTR 8)CL	02402 373A	LXD 2)+1,4	02474	XIT (LEV)				
02311 354A	ETM	02403 374A	CLA 3)	02475	ETM				
02312	NTR FJ	02404	STO FJFS+1,4	02476	CAL (IOH)I				
02313	NTR PJF+1,1	02405 375A	CLA 3)	02477	SLW 1				
02314	NTR SUM	02406	STO RHC+1,4	02500	CAL (CSH)				

		SUBROUTINES PUNCHED FROM LIBRARY							
LOG (10CH)C	EXP (1CH)I	EXP(3)	(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
02315	LTM		02407 376A	CLA PJF+1,4		02501 389C1	NTR 8)3F,0,81		
02316 355A	CAL *		02410	STO FJI+1,4		02502 39CA	ETM		
02317	XIT (FIL)		02411 376A1	TXI **1,4,1		02503	NTR SIGMA		
02320 357A	CLA I		02412 376A2	TXL 374A,4,200		02504	LTM		
02321	ADD 2+1		02413 377A	TRA 385A		02505 391A	CAL *		
02322	STO I		02414 378A	CAL *		02506	XIT (RTN)		
02323	LXD I,1		02415	XIT (LEV)		02507 392A	CAL *		
02324 358A	TRA 349A		02416	ETM		02510	XIT (LEV)		
02325 E12B	SXD C)G0,1		02417	CAL (IOH)I		02511	ETM		
02326 359A	CLA NPE		02420	SLW 1		02512	CAL (IOH)I		
02327	SUB NPE1		02421	CAL (CSH)		02513	SLW 1		
02330 359A1	TZE D)12F		02422 378D1	NTR 8)33,0,81		02514	CAL (CSH)		
02331	TPL 360A		02423 379A	ETM		02515 392C1	NTR 8)33,0,81		
02332	TRA D)12F		02424	NTR NFJI		02516 393A	ETM		
02333 360A	CLA NPE1		02425	LTM		02517	NTR L		
02334	ADD 2)+1		02426 380A	CAL *		02520	LTM		
02335	STO NPE1		02427	XIT (RTN)		02521	LXD L,4		
02336 361A	CLA FJMAX		02430 381A	LXD 2)+1,4		02522	SXD C)G5,4		
02337	STO CJC		02431	CLA NFJI		02523 394A	CAL *		
02340 362A	CLA NOOE		02432	STD 384A2		02524	XIT (RTN)		
02341	STO NJC		02433 382A	CAL *		02525 395A	CAL *		
02342 363A	LXD 2)+1,1		02434	XIT (LEV)		02526	XIT (LEV)		
02343 364A	CLA 3)		02435	ETM		02527	CAL KTAPE		
02344	STO TL+1,1		02436	CAL (IOH)I		02530	STD 396D1		
02345 365A	CLA 3)		02437	SLW 1		02531 396A	ETM		
02346	STO CS+1,1		02440	CAL (CSH)		02532	CAL (IOH)O		
02347 366A	CLA PJF+1,1		02441 382D1	NTR 8)LU,0,81		02533	SLW 1		
02350	STO PJC+1,1		02442 383A	ETM		02534	CAL (STH)		
02351 367A	CLA 3)		02443	NTR FJI+1,4		02535 396D1	NTR 8)08		
02352	STO PJF+1,1		02444	NTR CJ1		02536 397A	ETM		
02353 367A1	TXI **1,1,1		02445	LTM		02537	NTR NGC		
02354 367A2	TXL 364A,1,200		02446 384A	CAL *		02540	LTM		
02355 368A	TRA D)112		02447	XIT (RTN)		02541 398A	CAL *		
02356 D)12F	LXD C)G1,1		02450 384A1	TXI **1,4,1		02542	XIT (FIL)		
02357 369A	TRA 369A+7,1		02451 384A2	TXL 382A,4		02543 400A	CAL *		
02360	TRA 371A		02452 385A	CLA 2)+1		02544	XIT (LEV)		
02361	TRA 371A		02453	STO NGC		02545	CAL KTAPE		
02362	TRA 3A		02454 386A	CAL *		02546	STD 401D1		
02363	TRA 370A		02455	XIT (LEV)		02547 401A	ETM		
02364	TRA 3A		02456	ETM		02550	CAL (IOH)O		
02365	TTR 370A		02457	CAL (IOH)I		02551	SLW 1		
02366 E)62G	SXD C)G6,2		02460	SLW 1		02552	CAL (STH)		
02367	TTR D)22G		02461	CAL (CSH)		02553 401C1	NTR 8)3D		
02370 E)72G	SXD C)G6,2		02462 386D1	NTR 8)33,0,81		02554 402A	CAL *		
02371	SXD C)G7,1		02463 387A	ETM		02555	XIT (FIL)		
02372 D)32G	LXD C)G1,1		02464	NTR NGE		02556 403A	CAL *		
02373 D)22G	LXD C)G2,2		02465	LTM		02557	XIT (LEV)		

LOG (IHC)	EXP (IHC)I	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY (RTN) (LEV) (STH) (CSH) (FIL) (BDC) (DBC)			
02560	CAL KTAPE	02652	LRS 18	02744 432A	LDQ 3)+1	
02561	STD 404D1	02653	ORA 6)	02745	FMP CL	
02562 404A	ETM	02654	FAD 6)	02746	CHS	
02563	CAL (IHC)O	02655	STO CJ	02747	FSB FJMAX	
02564	SLW 1	02656 422A	CLA 2)+3	02750	FAD FJ	
02565	CAL (STH)	02657	STO I	02751 432A1	TZE 428A	
02566 404D1	NTR 8)CA	02660	LXD I,4	02752	TPL 433A	
02567 405A	ETM	02661 423A	CLA CJI	02753	TRA 428A	
02570	NTR SIGMA	02662	FSB CJ	02754 433A	CLA FJ1	
02571	LTM	02663 423A1	TZE E)2Q	02755	STO FJS	
02572 406A	CAL *	02664 424A	CLA 3)+3	02756 434A	CLA 2)+1	
02573	XIT (FIL)	02665	STO FJ1	02757	STO J	
02574 408A	CLA L	02666 425A	TRA 427A	02760	LXD J,2	
02575	LRS 18	02667 E)1Q	SXD C)G0,4	02761	TTR 435A	
02576	ORA 6)	02670 426A	CLA 3)	02762 D)112U	LXD C)G1,1	
02577	FAD 6)	02671	STO FJ1	02763 435A	CLA FJS	
02600	STO CL	02672 427A	CLA FJ1	02764	FAD CL	
02601 409A	CAL *	02673	STO FJ	02765	STO ULL	
02602	XIT (LEV)	02674 428A	CLA I	02766 436A	CLA FJS	
02603	CAL KTAPE	02675	ADD 2)+1	02767	FSB CL	
02604	STD 410D1	02676	STO I	02770	SSP	
02605 410A	ETM	02677	LXD I,4	02771	STO BLL	
02606	CAL (IHC)O	02700	SXD C)G0,4	02772 437A	CLA BLL	
02607	SLW 1	02701 429A	LDQ SIGMA	02773	STO CJ	
02610	CAL (STH)	02702	FMP 3)+1	02774 438A	CLA FJ1	
02611 410D1	NTR 8)107	02703	STO 7)	02775 438A1	TZE E)2V	
02612 411A	ETM	02704	LDQ 7)	02776	TPL 441A	
02613	NTR L	02705	FMP SIGMA	02777	TRA E)162G	
02614	LTM	02706	STO 1)+1	03000 E)2V	SXD C)G6,2	
02615 412A	CAL *	02707	CLA FJ	03001 439A	CLA CJ	
02616	XIT (FIL)	02710	FAD 3)+3	03002	UFA 6)	
02617 414A	CLA CL	02711	LDQ 3)+1	03003	LRS	
02620	FAD CJI	02712	SXD 6)+4,4	03004	ANA 6)+1	
02621	STO FJMAX	02713	TSX EXP(3,4	03005	LLS	
02622 415A	CAL *	02714	NTR *+2,0,255	03006	ALS 18	
02623	XIT (LEV)	02715	PZE 0,0,429	03007	STO JI	
02624	CAL KTAPE	02716	LXD 6)+4,4	03010	LXD JI,1	
02625	STD 416D1	02717	FDP 1)+1	03011	SXD C)G7,1	
02626 416A	ETM	02720	STQ 1)+2	03012 440A	TRA 442A	
02627	CAL (IHC)O	02721	CLS 1)+2	03013 441A	CLA CJ	
02630	SLW 1	02722	STO ARG	03014	FSB 3)+3	
02631	CAL (STH)	02723 430A	CLA ARG	03015	UFA 6)	
02632 416D1	NTR 8)7J3	02724	SXD 6)+4,4	03016	LRS	
02633 417A	ETM	02725	TSX EXP,4	03017	ANA 6)+1	
02634	NTR FJMAX	02726	NTR *+2,0,255	03020	LLS	
02635	LTM	02727	PZE 0,0,430	03021	ALS 18	

LOG (IOH)C	EXP (IOH)I	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY	(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
02636 418A	CAL *	02730	LXD 6)+4,4	03022	STO JI					
02637	XIT (FIL)	02731	STO 1)+1	03023	LXD JI,1					
02640 420A	CLA CJI	02732	LDQ 3)+1	03024	SXD CJG7,1					
02641	UFA 6)	02733	FMP FJ	03025 442A	CLA CJ					
02642	LRS	02734	FAD 3)+2	03026	FAD CL					
02643	ANA 6)+1	02735	STO 1)+2	03027	STO FML					
02644	LLS	02736	LDQ 1)+2	03030 443A	CLA CJ					
02645	ALS 18	02737	FMP 1)+1	03031	FSB CL					
02646	STO J	02740	STO RHO+1,4	03032	SSP					
02647	LXD J,4	02741 431A	CLA FJ	03033	STO FLL					
02650	SXD CJG6,4	02742	FAD 3)+2	03034 444A	CLA FLL					
02651 421A	CLA J	02743	STO FJ	03035	STO CI					
03056 445A	CLA FJ1	03130 457A	CLA JI	03222	CAL KTAPE					
03037 445A1	TZE 446A	03131	ADD 2)+1	03223	STD 472D1					
03040	TPL E)33	03132	STO JI	03224 472A	ETM					
03041	TRA E)72G	03133	LXD JI,1	03225	CAL (IOH)0					
03042 446A	CLA CI	03134 458A	CLA LLL	03226	SLW 1					
03043	UFA 6)	03135	FSB CJ	03227	CAL (STH)					
03044	LRS	03136 458A1	TZE 442A	03230 472C1	NTR 8)OC					
03045	ANA 6)+1	03137	TPL 442A	03231 473A	CAL *					
03046	LLS	03140 E)39	SXD CJG7,1	03232	XIT (FIL)					
03047	ALS 18	03141 459A	CLA J	03233 475A	CLA SUM					
03050	STO I	03142	ADD 2)+1	03234	FAD FJFS+1,4					
03051	LXD I,4	03143	STO J	03235	STO SUM					
03052 447A	TRA 449A	03144	LXD J,2	03236 476A	CLA FJ1					
03053 E)33	SXD CJG6,2	03145	SXD CJG6,2	03237	STO FJ					
03054	SXD CJG7,1	03146 460A	CLA FJS	03240 477A	CAL *					
03055 448A	CLA CI	03147	FAD 3)+2	03241	XIT (LEV)					
03056	FSB 3)+3	03150	STO FJS	03242	CAL KTAPE					
03057	UFA 6)	03151 461A	CLA FJMAX	03243	STD 478D1					
03060	LRS	03152	FSB FJS	03244 478A	ETM					
03061	ANA 6)+1	03153 461A1	TZE D)12U	03245	CAL (IOH)0					
03062	LLS	03154	TPL D)12U	03246	SLW 1					
03063	ALS 18	03155 462A	CLA FJ1	03247	CAL (STH)					
03064	STO I	03156	STO FJ	03250 478C1	NTR 8)OD					
03065	LXD I,4	03157 463A	CLA 3)	03251 479A	ETM					
03066	SXD CJG0,4	03160	STO FSUM	03252	NTR FJ					
03067 449A	CLA 3)	03161 464A	CLA 3)	03253	NTR FJI+1,4					
03070	STO SUM	03162	STO AVE	03254	NTR FJ					
03071	TTR 450A	03163 465A	LXD 2)+1,4	03255	NTR FJFS+1,4					
03072 E)35	SXD CJG6,2	03164	CLA J	03256	NTR SUM					
03073	SXD CJG7,1	03165	STD 467A2	03257	NTR AVE					
03074 450A	CLA SUM	03166 466A	LDQ FJFS+1,4	03260	LTM					
03075	FAD RHO,4	03167	FMP FJ	03261 480A	CAL *					
03076	STO SUM	03170	STO 7)	03262	XIT (FIL)					
03077 451A	CLA I	03171	LDQ 7)	03263 482A	CLA NFJ1					
03100	ADD 2)+1	03172	FMP FJ	03264	SUB 2)+T					

LOG		EXP	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY						
(IOH)C	(IOH)I			(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)	(DBC)
03101	STO I	03173	FAD AVE	03265	482A1	TZE 491A				
03102	LXD I,4	03174	STO AVE	03266		TPL 483A				
03103	SXD C)GO,4	03175	467A CLA FJ	03267		TRA D132G				
03104	452A CLA CI	03176	FAD 3)+2	03270	483A	LXD 2)+2,4				
03105	FAD 3)+2	03177	STO FJ	03271		CLA NFJI				
03106	STO CI	03200	467A1 TXI *+1,4,1	03272		STD 489A2				
03107	453A CLA FML	03201	467A2 TXL 466A,4	03273	484A	CLA FJ				
03110	FSB CI	03202	468A CLA FJMAX	03274		FAD 3)+2				
03111	453A1 TZE E)35	03203	FAD 3)+2	03275		STO FJ				
03112	TPL E)35	03204	UFA 6)	03276	485A	CLA SUM				
03113	454A CLA SUM	03205	LRS	03277		FAD FJFS+1,4				
03114	454A1 TZE E)38	03206	ANA 6)+1	03300		STO SUM				
03115	455A CLA FJ,1	03207	LLS	03301	486A	CAL *				
03116	FDP SUM	03210	ALS 18	03302		XIT (LEV)				
03117	FMP RHO+1,2	03211	STO JJ	03303		CAL KTAPE				
03120	FAD FJFS+1,2	03212	469A CLA 2)+1	03304		STD 487D1				
03121	STO FJFS+1,2	03213	STO I	03305	487A	ETM				
03122	TTR 456A	03214	LXD I,4	03306		CAL (IOH)0				
03123	E)38 SXD C)G6,2	03215	SXD C)GO,4	03307		SLW 1				
03124	SXD C)G7,1	03216	470A CLA 3)	03310		CAL (STH)				
03125	456A CLA CJ	03217	STO SUM	03311	487C1	NTR 8JOE				
03126	FAD 3)+2	03220	471A CAL *	03312	488A	ETM				
03127	STO CJ	03221	XIT (LEV)	03313		NTR FJ				
03314	NTR FJI+1,4	03406	TRA E)3M	035C0		BCD 1F,13X,				
03315	NTR FJ	03407	505A LXD 2)+1,4	035C1		BCD 17X,2HJ				
03316	NTR FJFS+1,4	03410	506A CLA FJFS+1,4	035C2		BCD 1HJF1,1				
03317	NTR SUM	03411	STO FJI+1,4	035C3		BCD 1,13X,3				
03320	LTM	03412	507A CLA 3)	035C4		BCD 1X,2HJI				
03321	489A CAL *	03413	STO RHO+1,4	035C5	8)CC	BCD 1(1H0,5				
03322	XIT (FIL)	03414	508A CLA 3)	035C6		BCD 1=F,6,3)				
03323	489A1 TXI *+1,4,1	03415	STO FJFS+1,4	035C7		BCD 1MAX)+L				
03324	489A2 TXL 484A,4	03416	508A1 TXI *+1,4,1	03510		BCD 1X)=JI(				
03325	491A CLA FJ	03417	508A2 TXL 506A,4,200	03511		BCD 1HJF(MA				
03326	FAD 3)+2	03420	509A CLA NFJI	03512		BCD 1X, 18				
03327	STO FJ	03421	ADD L	03513	8)7J3	BCD 1(1H0,2				
03330	492A CLA NFJI	03422	STO NFJI	03514		BCD 1ON 12)				
03331	ADD 2)+1	03423	510A CLA FJMAX	03515		BCD 1EMISSI				
03332	STO I	03424	STO CJI	03516		BCD 1-RAY				
03333	LXD I,4	03425	511A TRA D)320	03517		BCD 1 GAMMA				
03334	TTR 493A	03426	E)3M SXD C)GO,4	03520		BCD 1Y OF				
03335	E)3H SXD C)GO,4	03427	512A TRA D)600	03521		BCD 1OLARIT				
03336	493A CLA SUM	03430	2) OCT +000006000000	03522		BCD 1MULTIP				
03337	FAD FJFS+1,4	03431	OCT +000001000000	03523		BCD 14X,39H				
03340	STO SUM	03432	OCT +000002000000	03524	8)C7	BCD 1(1H0,2				

LOG (ICH)C	EXP (ICH)I	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY					
			(RTN)	(LEV)	(STH)	(CSH)	(FIL)	(BDC)
03341	494A	CAL *	03433	OCT +0C00000000000	03525	BCD 1 F6.3)		
03342		XIT (LEV)	03434 3)	OCT +0C00000000000	03526	BCD 1CTCR =		
03343		CAL KTAPE	03435	OCT +2C24000000000	03527	BCD 1FF FA		
03344		STD 49501	03436	OCT +2014000000000	03530	BCD 1CUT 0		
03345	495A	ETM	03437	OCT +2004000000000	03531	BCD 1SPIN		
03346		CAL (ICH)0	03440 6)	OCT +233C000000000	03532	BCD 14X,24H		
03347		SLW 1	03441	OCT +0C00000077777	03533 8)CA	BCD 1(1H0,2		
03350		CAL (STH)	03442	OCT +0000000000000	03534	BCD 1//		
03351	49501	NTR 8)OF	03443	OCT +0C000010C0000	03535	BCD 1 12,/		
03352	496A	ETM	03444	OCT +00000000C0000	03536	BCD 1Y NO.		
03353		NTR FJ	03445	BCD 15.8) J	03537	BCD 1MA RA		
03354		NTR FJFS+1,4	03446	BCD 1(7X,E1	03540	BCD 1F GAM		
03355		NTR SUM	03447	BCD 1F4.1,2	03541	BCD 1ION 0		
03356		LTM	03450	BCD 1 39X,	03542	BCD 1 EMISS		
03357	497A	CAL *	03451 8)OF	BCD 1(1H ,	03543	BCD 1OWING		
03360		XIT (FIL)	03452	BCD 115.8)	03544	BCD 1 FOLL		
03361	499A	CLA I	03453	BCD 12(7X,E	03545	BCD 1BUTION		
03362		ADD 2)+1	03454	BCD 1,F4.1,	03546	BCD 1DISTRI		
03363		STO I	03455	BCD 15.8,9X	03547	BCD 1SPIN		
03364		LXD I,4	03456	BCD 1,7X,E1	03550	BCD 1IZED		
03365	500A	CLA FJ	03457	BCD 1X,F4.1	03551	BCD 1NORMAL		
03366		FAD 3)+2	03460 8)OE	BCD 1(1H ,4	03552	BCD 14X,72H		
03367		STO FJ	03461	BCD 115.8)	03553 8)CE	BCD 1(1H1,2		
03370	501A	CLA FJMAX	03462	BCD 13(7X,E	03554	BCD 1))		
03371		FSB FJ	03463	BCD 1,F4.1,	03555	BCD 1,E15.8		
03372	501A1	TZE E13H	03464	BCD 15.8,9X	03556	BCD 11,2(4X		
03373		TPL E13H	03465	BCD 1,7X,E1	03557	BCD 14X,F4.		
03374	502A	CLA NGE	03466	BCD 1X,F4.1	03560 8)CL	BCD 1(1H ,5		
03375		SUB 2)+1	03467 8)0D	BCD 1(1H0,4	03561	BCD 1 )		
03376		STO NGE	03470	BCD 1)	03562	BCD 1E15.8)		
03377	503A	CLA NGC	03471	BCD 1) AVE.	03563	BCD 1,2(4X,		
03400		ADD 2)+1	03472	BCD 1)F(JF)	03564	BCD 1X,F4.1		
03401		STO NGC	03473	BCD 1X,13H(	03565	BCD 115.8,4		
03402	504A	CLA NGE	03474	BCD 1FJF,12	03566	BCD 11,4X,E		
03403		SUB 2)+1	03475	BCD 1SLM	03567	BCD 17X,F4.		
03404	504A1	TZE 505A	03476	BCD 117X,9H	03570 8)CK	BCD 1(1H ,2		
03405		TPL 505A	03477	BCD 13HFJF,	03571	BCD 18))		
03572		BCD 1X,E15.	03664	BCD 1 WILL	03756	BCD 1,F4.1,		
03573		BCD 11, 2)4	03665	BCD 1OUTPUT	03757	BCD 15.8,5X		
03574		BCD 14X,F4.	03666	BCD 14X,31H	03760	BCD 1,5X,E1		
03575		BCD 1E15.8,	03667 8)3K	BCD 1(1H0,2	03761	BCD 1X,F4.1		
03576		BCD 1,1,4X,	03670	BCD 1=F7.4)	03762 8)12R	BCD 1(1H ,1		
03577		BCD 1,4X,F4	03671	BCD 1 PRIME	03763	BCD 115.8))		
03600		BCD 1,E15.8	03672	BCD 1CMAX+S	03764	BCD 14(5X,E		
03601		BCD 14.1,4X	03673	BCD 1LMAX+J	03765	BCD 1,F4.1,		
03602	8)CJ	BCD 1(1H ,F	03674	BCD 1JFMAX=	03766	BCD 15.8,5X.		

LOG (IHC)C	EXP (IOH)I	EXP(3)	SUBROUTINES PUNCHED FROM LIBRARY (RTN) (LEV) (STH) (CSH) (FIL) (BDC) (DBC)			
03603	BCD 1))	03675	BCD 14X,25H	03767	BCD 1,5X,E1	
03604	BCD 1,E15.8	03676 8)3J	BCD 1(1H0,2	03770	BCD 1X,F4.1	
03605	BCD 11,3(4X	03677	BCD 1=F6.4)	03771 8)12Q	BCD 1(1H,1	
03606	BCD 14X,F4.	03700	BCD 1 SPIN	03772	BCD 1//)	
03607	BCD 1E15.8,	03701	BCD 1RTICLE	03773	BCD 1 AVE./	
03610	BCD 1,1,4X,	03702	BCD 1NG PA	03774	BCD 1C)(JC)	
03611	BCD 1,4X,F4	03703	BCD 1OUTGOI	03775	BCD 1,13H(J	
03612	BCD 1,E15.8	03704	BCD 14X,25H	03776	BCD 1JC,10X	
03613	BCD 14,1,4X	03705 8)3M	BCD 1(1H0,2	03777	BCD 1UM P	
03614 8)CI	BCD 1(1H0,F	03706	BCD 1)	04000	BCD 14X,9HS	
03615	BCD 1VE.)	03707	BCD 1 E15.8	04001	BCD 1HPJC,1	
03616	BCD 1(JF) A	03710	BCD 1 WAS	04002	BCD 1,12X,3	
03617	BCD 13H(JF)	03711	BCD 1 SIGMA	04003	BCD 1ECTION	
03620	BCD 1, 9X,1	03712	BCD 1INPUT	04004	BCD 1ROSS S	
03621	BCD 1 PJF	03713	BCD 14X,19H	04005	BCD 1X,13H	
03622	BCD 1,9HSUM	03714 8)13I	BCD 1(1H0,2	04006	BCD 12HJC,5	
03623	BCD 1JF,13X	03715	BCD 1//)	04007	BCD 1L,13X,	
03624	BCD 11X,3HP	03716	BCD 10. I2,	04010	BCD 15X,2HT	
03625	BCD 12HJC,1	03717	BCD 1CLE_N	04011	BCD 1H_L,1	
03626	BCD 1C,12X,	03720	BCD 1 PARTI	04012 8)112P	BCD 1(1H0,3	
03627	BCD 1X,3+PJ	03721	BCD 1 FOR	04013	BCD 1 TL,1	
03630	BCD 1HJC,11	03722	BCD 1BLTION	04014	BCD 1UES OF	
03631	BCD 1,11X,2	03723	BCD 1DISTRI	04015	BCD 1UT VAL	
03632	BCD 1X,2HTL	03724	BCD 10X,33H	04016	BCD 19H INP	
03633	BCD 1H L,13	03725 8)RQ	BCD 1(1H0,3	04017	BCD 1R I2,1	
03634 8)CH	BCD 1(1H0,2	03726	BCD 10N//)	04020	BCD 1GER FO	
03635	BCD 1)	03727	BCD 1EMISSI	04021	BCD 1F-INTE	
03636	BCD 1 TL,1	03730	BCD 1TICLE	04022	BCD 1BE HAL	
03637	BCD 1ES OF	03731	BCD 1NG PAR	04023	BCD 1 WILL	
03640	BCD 1 VALU	03732	BCD 1OLLOWI	04024	BCD 1OUTPUT	
03641	BCD 1 INPUT	03733	BCD 1TION F	04025	BCD 10X,32H	
03642	BCD 1I2,22H	03734	BCD 1STRIBU	04026 8)16C	BCD 1(1H0,1	
03643	BCD 1 FOR	03735	BCD 1PIN DI	04027	BCD 1)	
03644	BCD 1INTEGER	03736	BCD 1IZED S	04030	BCD 1F TL,1	
03645	BCD 1HALF-I	03737	BCD 1NORMAL	04031	BCD 1LUES O	
03646	BCD 1 BE	03740	BCD 15X,56H	04032	BCD 1PUT VA	
03647	BCD 1 WILL	03741 8)13H	BCD 1(1H,1	04033	BCD 119H IN	
03650	BCD 1OUTPUT	03742	BCD 1-1)	04034	BCD 1OR I2,	
03651	BCD 14X,36H	03743	BCD 1,5X,F4	04035	BCD 1TEGER F	
03652 8)3L	BCD 1(1H0,2	03744 8)UU	BCD 1(E15.8	04036	BCD 1BE INT	
03653	BCD 1/)	03745 8)33	BCD 1(I2)	04037	BCD 1 WILL	
03654	BCD 1F TL,	03746 8)3F	BCD 1(F6.3)	04040	BCD 1OUTPUT	
03655	BCD 1UES O	03747	BCD 1))	04041	BCD 10X,27H	
03656	BCD 1T VAL	03750	BCD 1,E15.8	04042 8)16B	BCD 1(1H0,1	
03657	BCD 1H INPU	03751	BCD 11,3(5X	04043	BCD 11)	
03660	BCD 1 I2,22	03752	BCD 10X,F4.	04044	BCD 1IN=F4.	



SUBROUTINES PUNCHED FROM LIBRARY  
 (RTN)            (LEV)            (STH)

LOG (IOH)C	EXP (IOH)I	EXP(3)	(CSH)	(FIL)	(BDC)	(DBC)
04123 8)1	BCD 1	(3E15				
04124	BCD 1	)				
04125	BCD 1					
04126	BCD 1					
04127	BCD 1					
04130	BCD 1					
04131	BCD 1					
04132	BCD 1					
04133	BCD 1					
04134	BCD 1					
04135	BCD 1					
04136	BCD 1					
04137	BCD 1					
04140 8)3D	BCD 1	(72F				

## IX. SAMPLE INPUT DATA SHEETS

704 INPUT DATA

FORM II

COST CODE \_\_\_\_\_

PROGRAM	SAMPLE	PROBLEM	ORIGINATOR	DATE	PAGE 1 OF 4		
1	2	3	4	5	6	7	8
1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
P 1 . . 1 A, G - 1, 0, 8, 1 + ( 3, 2, 1 M, E V, ., 1 ) H, E 4, 1							
0, 6, 1, 1, 1, 1, 1, 1, 1, 1							
+ 0, 1, 5, 0, 0, 0, 0, 0, E + 0, 0, 1, + 0, 0, 0, 0, 0, 0, E + 0, 0, + 0, 1, 0, 0, 0, 0, 0, 0, 0, + E, 0, 1, 0, 2, 8							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 0, 1, 0							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 1, 1, 0							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 2, 1, 0							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 3, 1, 0							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 4, 1, 0							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 5, 1, 0							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 6, 1, 0							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 7, 1, 0							
+ 0, 1, 1, 0, 0, 0, 0, 0, 0, E + 0, 1, 1, 1, L = 0, 8, 1, 0							
+ 0, 1, 9, 9, 9, 0, 0, 0, 0, 0, E + 0, 0, 1, 1, L = 0, 9, 1, 0							
+ 0, 1, 9, 9, 9, 0, 0, 0, 0, 0, E + 0, 0, 1, 1, L = 1, 0, 1, 0							
+ 0, 1, 9, 9, 7, 0, 0, 0, 0, 0, E + 0, 0, 1, 1, L = 1, 1, 1, 0							
+ 0, 1, 9, 9, 3, 0, 0, 0, 0, 0, E + 0, 0, 1, 1, L = 1, 2, 1, 0							
+ 0, 1, 9, 8, 3, 0, 0, 0, 0, 0, E + 0, 0, 1, 1, L = 1, 3, 1, 0							
+ 0, 1, 9, 4, 6, 0, 0, 0, 0, 0, E + 0, 0, 1, 1, L = 1, 4, 1, 0							
+ 0, 1, 8, 4, 2, 0, 0, 0, 0, 0, E + 0, 0, 1, 1, L = 1, 5, 1, 0							
+ 0, 1, 6, 0, 8, 0, 0, 0, 0, 0, E + 0, 0, 1, 1, L = 1, 6, 1, 0							
1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
	1	2	3	4	5	6	7

## 704 INPUT DATA

## FORM II

COST CODE \_\_\_\_\_

PROGRAM	SAMPLE	PROBLEM	ORIGINATOR	DATE	PAGE 2 OF 4			
	1	2	3	4	5	6	7	8
1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
+0..3.05	0,0,0,0,0,E	+0,0,1,1,L=17,r0						
+0..1,2,3	0,0,0,0,0,E	+0,0,1,1,L=18,r0						
+0..4,9,2	0,0,0,0,0,E	-0,1,1,1,L=19,r0						
+0..2,0,7	0,0,0,0,0,E	-0,1,1,1,L=20,r0						
+0..8,8,7	0,0,0,0,0,E	-0,2,1,1,L=21,r0						
+0..3,7,1	0,0,0,0,0,E	-0,2,1,1,L=22,r0						
+0..1,4,7	0,0,0,0,0,E	-0,2,1,1,L=23,r0						
+0..5,4,5	0,0,0,0,0,E	-0,3,1,1,L=24,r0						
+0..1,8,8	0,0,0,0,0,E	-0,3,1,1,L=25,r0						
+0..6,0,2	0,0,0,0,0,E	-0,4,1,1,L=26,r0						
+0..1,7,9	0,0,0,0,0,E	-0,4,1,1,L=27,r0						
0,3								
1..5,0,0								
0,7								
+0..1,7,4,0	0,0,0,0,0,E	-0,0,1,1,L=0,0,r0						
+0..1,6,8,8	0,0,0,0,0,E	-0,0,1,1,L=0,1,r0						
+0..1,5,6,2	0,0,0,0,0,E	-0,0,1,1,L=0,2,r0						
+0..1,3,2,1,6	0,0,0,0,0,E	-0,0,1,1,L=0,3,r0						
+0..1,9,5,0	0,0,0,0,0,E	-0,1,1,1,L=0,4,r0						
+0..1,1,0,8	0,0,0,0,0,E	-0,1,1,1,L=0,5,r0						
1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
	1	2	3	4	5	6	7	8

## 704 INPUT DATA

## FORM II

COST CODE \_\_\_\_\_

PROGRAM	SAMPLE	PROBLEM	ORIGINATOR	DATE	PAGE	3 OF 4		
	1	2	3	4	5	6	7	8
1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9
+01..16.0	0,0,0,0,0,E	- 0,2,1,	L <sub>i</sub> =0,6,1,0					
0,3,-0,0,0								
0,6,1,1,1,1		0	1					
+01..6,8,2	0,0,0,0,0,E	- 0,0,1,	L <sub>i</sub> =0,0,1,0					
+01..6,0,8	0,0,0,0,0,E	- 0,0,1,	L <sub>i</sub> =0,1,1,0					
+01..4,4,3	0,0,0,0,0,E	- 0,0,1,	L <sub>i</sub> =0,2,1,0					
+01..1,8,6	0,0,0,0,0,E	- 0,0,1,	L <sub>i</sub> =0,3,1,0					
+01..2,9,4	0,0,0,0,0,E	- 0,1,1,	L <sub>i</sub> =0,4,1,0					
+01..3,2,0	0,0,0,0,0,E	- 0,2,1,	L <sub>i</sub> =0,5,1,0					
0,3,-0,0,0								
0,5,1,1,1,1								
+01..4,4,8	0,0,0,0,0,E	- 0,0,1,	L <sub>i</sub> =0,0,1,0					
+01..3,0,0	0,0,0,0,0,E	- 0,0,1,	L <sub>i</sub> =0,1,1,0					
+01..8,5,0	0,0,0,0,0,E	- 0,1,1,	L <sub>i</sub> =0,2,1,0					
+01..5,6,0	0,0,0,0,0,E	- 0,2,1,	L <sub>i</sub> =0,3,1,0					
+01..1,1,0	0,0,0,0,0,E	- 0,2,1,	L <sub>i</sub> =0,4,1,0					
0,3,-0,0,0								
0,2,1,1,1,1								
0,3,-0,0,0								
0,1,1,1,1,1								
1	2	3	4	5	6	7	8	9

**704 INPUT DATA**

**FORM II**

**COST CODE**

**PROGRAM SAMPLE**

### PROBLEM

ORIGINATOR

DATE

PAGE 4 OF 4

## X. SAMPLE CASE RESULTS

NORMALIZED INITIAL COMPOUND NUCLEUS SPIN DISTRIBUTION

AG-108 +(32 MEV.) HE4

INPUT TARGET SPIN WAS 0.500

INPUT PROJECTILE SPIN WAS 0.

PROPORTIONALITY CONSTANT WAS 1.000

JCMAX=LMAX+TARGET SPIN+PROJECTILE SPIN=27.5

OUTPUT WILL BE HALF-INTEGER FOR 28 INPUT VALUES OF TL

L	TL	JC	CROSS SECTION	PJC	SUM	PJC	(JC)(JC) AVE.
0.	0.09999999E 01	0.5	0.20000000E 01	0.69563189E-02	0.69563189E-02		0.13829647E 03
1.0	0.09999999E 01	1.5	0.40000000E 01	0.13912638E-01	0.20866956E-01		
2.0	0.09999999E 01	2.5	0.59999999E 01	0.20866956E-01	0.41737913E-01		
3.0	0.09999999E 01	3.5	0.80000000E 01	0.27825275E-01	0.69563188E-01		
4.0	0.09999999E 01	4.5	0.09999999E 02	0.34781595E-01	0.10434478E-00		
5.0	0.09999999E 01	5.5	0.12000000E 02	0.41737913E-01	0.14608269E-00		
6.0	0.09999999E 01	6.5	0.13999999E 02	0.48694232E-01	0.19477692E-00		
7.0	0.09999999E 01	7.5	0.16000000E 02	0.55656551E-01	0.25042748E-00		
8.0	0.09999999E 01	8.5	0.17991000E 02	0.62575566E-01	0.31300304E-00		
9.0	0.99900000E 00	9.5	0.19979999E 02	0.69493625E-01	0.38249666E-00		
10.0	0.99900000E 00	10.5	0.21956000E 02	0.76364468E-01	0.45886313E-00		
11.0	0.99699999E 00	11.5	0.23879999E 02	0.83058447E-01	0.54192158E 00		
12.0	0.99299999E 00	12.5	0.25687999E 02	0.89346959E-01	0.63126853E 00		
13.0	0.98300000E 00	13.5	0.27060000E 02	0.93931173E-01	0.72519970E 00		
14.0	0.94599999E 00	14.5	0.26820000E 02	0.93284235E-01	0.81848393E 00		
15.0	0.84199999E 00	15.5	0.23199999E 02	0.80693299E-01	0.89917723E 00		
16.0	0.60800000E 00	16.5	0.15521000E 02	0.53984512E-01	0.95316174E 00		
17.0	0.30500000E-00	17.5	0.77039999E 01	0.26795740E-01	0.97995748E 00		
18.0	0.12300000E-00	18.5	0.32717999E 01	0.11379842E-01	0.99133731E 00		
19.0	0.49199999E-01	19.5	0.13980000E 01	0.48624668E-02	0.99619978E 00		
20.0	0.20699999E-01	20.5	0.62096999E 00	0.21598326E-02	0.99835961E 00		
21.0	0.88699999E-02	21.5	0.27675999E-00	0.96261539E-03	0.99932222E 00		
22.0	0.37099999E-02	22.5	0.11913999E-00	0.41438791E-03	0.99973661E 00		
23.0	0.14699999E-02	23.5	0.48359998E-01	0.16820379E-03	0.99990480E 00		
24.0	0.54499999E-03	24.5	0.18325000E-01	0.63737270E-04	0.99996854E 00		
25.0	0.18799999E-03	25.5	0.64531999E-02	0.22445258E-04	0.99999098E 00		
26.0	0.60199999E-04	26.5	0.21086999E-02	0.73343947E-05	0.99999831E 00		
27.0	0.17900000E-04	27.5	0.50119999E-03	0.17432535E-05	0.10000000E 01		

## NORMALIZED SPIN DISTRIBUTION FOLLOWING PARTICLE EMISSION

AG-108 +(32 MEV.) HE4

## DISTRIBUTION FOR PARTICLE NO. 1

INPUT SIGMA WAS 0.3000000E 01

CUTGOING PARTICLE SPIN=0.5000

JFMAX=LMAX+JCMAX+S PRIME=34.0000

OUTPUT WILL BE INTEGER FOR 7 INPUT VALUES OF TL

L	TL	JC	PJC	JF	PJF	SUM	PJF	(JF)(PJF) AVE.
0.	0.73999999E 00	0.5	0.69563189E-02	0.	0.15979229E-02	0.15979229E-02		0.85345948E 02
1.0	0.68799999E 00	1.5	0.13912638E-01	1.0	0.12365610E-01	0.13963533E-01		
2.0	0.56200000E 00	2.5	0.20868956E-01	2.0	0.27168589E-01	0.41132122E-01		
3.0	0.32600000E-00	3.5	0.27825275E-01	3.0	0.41307787E-01	0.82439909E-01		
4.0	0.95000000E-01	4.5	0.34781595E-01	4.0	0.53906175E-01	0.13634608E-00		
5.0	0.10800000E-01	5.5	0.41737913E-01	5.0	0.65695091E-01	0.20204117E-00		
6.0	0.16000000E-02	6.5	0.48694232E-01	6.0	0.77099320E-01	0.27914049E-00		
		7.5	0.55650551E-01	7.0	0.88103742E-01	0.36724424E-00		
		8.5	0.62575566E-01	8.0	0.98406561E-01	0.46565080E-00		
		9.5	0.69493625E-01	9.0	0.10695436E-00	0.57260516E 00		
		10.5	0.76366468E-01	10.0	0.11092056E-00	0.68352571E 00		
		11.5	0.83058447E-01	11.0	0.10564148E-00	0.78916771E 00		
		12.5	0.89346959E-01	12.0	0.87874655E-01	0.87704184E 00		
		13.5	0.93931173E-01	13.0	0.61066779E-01	0.93810864E 00		
		14.5	0.93284235E-01	14.0	0.34797304E-01	0.97290594E 00		
		15.5	0.80693299E-01	15.0	0.16480331E-01	0.98936272E 00		
		16.5	0.53984512E-01	16.0	0.67455640E-02	0.99613183E 00		
		17.5	0.26795740E-01	17.0	0.25159603E-02	0.99864779E 00		
		18.5	0.11379842E-01	18.0	0.89643116E-03	0.9995421E 00		
		19.5	0.48624668E-02	19.0	0.31013066E-03	0.99985434E 00		
		20.5	0.21598326E-02	20.0	0.10274322E-03	0.99995708E 00		
		21.5	0.96261539E-03	21.0	0.31732239E-05	0.99998881E 00		
		22.5	0.41438791E-03	22.0	0.87499835E-05	0.99999756E 00		
		23.5	0.16820379E-03	23.0	0.20470264E-05	0.99999960E 00		
		24.5	0.63737270E-04	24.0	0.36302684E-06	0.99999996E 00		
		25.5	0.22445258E-04	25.0	0.45592719E-07	0.99999999E 01		
		26.5	0.73343947E-05	26.0	0.40985574E-08	0.99999999E 01		
		27.5	0.17432535E-05	27.0	0.26468222E-09	0.99999999E 01		
		28.0		0.10755653E-10		0.99999999E 01		
		29.0		0.27486651E-12		0.99999999E 01		
		30.0		0.50826766E-14		0.99999999E 01		
		31.0		0.59770381E-16		0.99999999E 01		
		32.0		0.37542471E-18		0.99999999E 01		
		33.0		0.11531736E-20		0.99999999E 01		
		34.0		0.29755525E-23		0.99999999E 01		

## NORMALIZED SPIN DISTRIBUTION FOLLOWING PARTICLE EMISSION

AG-108 +(32 MEV.) HE4

## DISTRIBUTION FOR PARTICLE NC. 2

INPUT SIGMA WAS 0.3000000E 01

CUTGOING PARTICLE SPIN=0.5000

JFMAX=LMAX+JCMAX+S PRIME=39.5000

CUTPUT WILL BE HALF-INTEGER FOR 6 INPUT VALUES OF TL

L	TL	JC	PJC	JF	PJF	SUM	PJF	(JF)(PJF)	AVE.
0.	0.68200000E 00	0.	0.15979229E-02	0.5	0.79835507E-02	0.79835507E-02		0.58140123E 02	
1.0	0.60800000E 00	1.0	0.12365610E-01	1.5	0.27744038E-01	0.35727588E-01			
2.0	0.44300000E 00	2.0	0.27168589E-01	2.5	0.51191904E-01	0.86919492E-01			
3.0	0.18600000E 00	3.0	0.41307787E-01	3.5	0.73108239E-01	0.16002773E-00			
4.0	0.29399999E-01	4.0	0.53906175E-01	4.5	0.92367705E-01	0.25239544E-00			
5.0	0.31999999E-02	5.0	0.65695091E-01	5.5	0.10915852E-00	0.36155395E-00			
	6.0		0.77099320E-01	6.5	0.12242217E-00	0.48397612E-00			
	7.0		0.88103742E-01	7.5	0.12878471E-00	0.61276083E-00			
	8.0		0.98406561E-01	8.5	0.12353349E-00	0.73629432E-00			
	9.0		0.10695436E-00	9.5	0.10440129E-00	0.84069561E-00			
	10.0		0.11092056E-00	10.5	0.75450767E-01	0.91614638E-00			
	11.0		0.10564148E-00	11.5	0.45751365E-01	0.96189774E-00			
	12.0		0.87876455E-01	12.5	0.23131125E-01	0.98502886E-00			
	13.0		0.61066779E-01	13.5	0.98155293E-02	0.99484439E-00			
	14.0		0.34797304E-01	14.5	0.35640920E-02	0.99840848E-00			
	15.0		0.16480331E-01	15.5	0.11406691E-02	0.99954915E-00			
	16.0		0.67455640E-02	16.5	0.33217906E-03	0.99988133E-00			
	17.0		0.25159603E-02	17.5	0.89848942E-04	0.99997117E-00			
	18.0		0.89643116E-03	18.5	0.22530273E-04	0.99999370E-00			
	19.0		0.31013066E-03	19.5	0.51135213E-05	0.99999881E-00			
	20.0		0.10274322E-03	20.5	0.10119065E-05	0.99999981E-00			
	21.0		0.31732239E-04	21.5	0.16777929E-06	0.99999998E-00			
	22.0		0.87499835E-05	22.5	0.22557683E-07	0.99999999E-01			
	23.0		0.20470264E-05	23.5	0.23966867E-08	0.99999999E-01			
	24.0		0.36302684E-06	24.5	0.19754459E-09	0.99999999E-01			
	25.0		0.45592719E-07	25.5	0.12498863E-10	0.99999999E-01			
	26.0		0.40985574E-08	26.5	0.60321327E-12	0.99999999E-01			
	27.0		0.26966822E-09	27.5	0.21994828E-13	0.99999999E-01			
	28.0		0.10755653E-10	28.5	0.60047227E-15	0.99999999E-01			
	29.0		0.27986451E-12	29.5	0.12256656E-16	0.99999999E-01			
	30.0		0.50826766E-14	30.5	0.18662975E-18	0.99999999E-01			
	31.0		0.59770381E-16	31.5	0.21051674E-20	0.99999999E-01			
	32.0		0.37542471E-18	32.5	0.17535102E-22	0.99999999E-01			
	33.0		0.11531736E-20	33.5	0.10687181E-24	0.99999999E-01			
	34.0		0.29755525E-23	34.5	0.46334403E-27	0.99999999E-01			
				35.5	0.13824728E-29	0.99999999E-01			
				36.5	0.27530446E-32	0.99999999E-01			
				37.5	0.35323656E-35	0.99999999E-01			
				38.5	0.	0.99999999E-01			
				39.5	0.	0.99999999E-01			

## NORMALIZED SPIN DISTRIBUTION FOLLOWING PARTICLE EMISSION

AG-108 +(32 MEV.) HE4

## DISTRIBUTION FOR PARTICLE NO. 3

INPUT SIGMA WAS 0.30000000E 01

OUTGOING PARTICLE SPIN=0.5000

JFMAX=LMAX+JCMAX+S PRIME=44.0000

OUTPUT WILL BE INTEGER FOR 5 INPUT VALUES OF TL

L	TL	JC	PJC	JF	PJF	SUM	PJF	(JF)(PJF) AVE.
0.	0.44800000E-00	0.5	0.79835507E-02	0.	0.25183706E-02	0.25183706E-02	0.47605637E 02	
1.0	0.30000000E-00	1.5	0.27744038E-01	1.0	0.20712378E-01	0.23230749E-01		
2.0	0.84999999E-01	2.5	0.51191904E-01	2.0	0.48947858E-01	0.72178607E-01		
3.0	0.55999999E-02	3.5	0.73108239E-01	3.0	0.78294618E-01	0.15047322E-00		
4.0	0.11000000E-02	4.5	0.92367705E-01	4.0	0.10417160E-00	0.25464483E-00		
		5.5	0.10915852E-00	5.0	0.12492453E-00	0.37956935E-00		
6.0	0.12242217E-00	6.0	0.13808265E-00	5.0	0.51765200E 00			
		7.5	0.12878471E-00	7.0	0.13917442E-00	0.65682642E 00		
8.5	0.12353349E-00	8.0	0.12464985E-00	8.0	0.78147627E 00			
		9.5	0.10440129E-00	9.0	0.96502580E-01	0.87797885E 00		
10.5	0.75450767E-01	10.0	0.63187097E-01	10.0	0.94116594E 00			
		11.5	0.45751365E-01	11.0	0.34537216E-01	0.97570315E 00		
12.5	0.23131125E-01	12.0	0.15698934E-01	12.0	0.99140208E 00			
		13.5	0.98155293E-02	13.0	0.59666020E-02	0.99736868E 00		
14.5	0.35640920E-02	14.0	0.19234931E-02	14.0	0.99929217E 00			
		15.5	0.11406691E-02	15.0	0.53747628E-03	0.99982964E 00		
16.5	0.33217906E-03	16.0	0.13329065E-03	16.0	0.99996292E 00			
		17.5	0.89848942E-04	17.0	0.29815548E-04	0.99999273E 00		
18.5	0.22530273E-04	18.0	0.60150840E-05	18.0	0.99999874E 00			
		19.5	0.51135213E-05	19.0	0.10753836E-05	0.99999981E 00		
20.5	0.10119065E-05	20.0	0.16567379E-06	20.0	0.99999988E 00			
		21.5	0.16779292E-06	21.0	0.21355733E-07	0.99999999E 00		
22.5	0.22557683E-07	22.0	0.22458161E-08	22.0	0.99999999E 00			
		23.5	0.23968867E-08	23.0	0.18897540E-09	0.99999999E 00		
24.5	0.19754459E-09	24.0	0.12546731E-10	24.0	0.99999999E 00			
		25.5	0.12498863E-10	25.0	0.6511590E-12	0.99999999E 00		
26.5	0.60321327E-12	26.0	0.26261054E-13	26.0	0.99999999E 00			
		27.5	0.21994828E-13	27.0	0.81957554E-15	0.99999999E 00		
28.5	0.60047227E-15	28.0	0.19719120E-16	28.0	0.99999999E 00			
		29.5	0.12256656E-16	29.0	0.36472525E-18	0.99999999E 00		
30.5	0.18662975E-18	30.0	0.51792814E-20	30.0	0.99999999E 00			
		31.5	0.21051674E-20	31.0	0.56535598E-22	0.99999999E 00		
32.5	0.17535102E-22	32.0	0.47225063E-24	32.0	0.99999999E 00			
		33.5	0.10687181E-24	33.0	0.30308854E-26	0.99999999E 00		
34.5	0.46334040E-27	34.0	0.14913399E-28	34.0	0.99999999E 00			
		35.5	0.13824728E-29	35.0	0.56148211E-31	0.99999999E 00		
36.5	0.27550446E-32	36.0	0.16096389E-33	36.0	0.99999999E 00			
		37.5	0.35323656E-35	37.0	0.34833739E-36	0.99999999E 00		
38.5	0.	38.0	0.	38.0	0.99999999E 00			
		39.5	0.	39.0	0.	0.99999999E 00		
40.5	0.	40.0	0.	40.0	0.99999999E 00			
		41.0	0.	41.0	0.	0.99999999E 00		
42.0	0.	42.0	0.	42.0	0.99999999E 00			
		43.0	0.	43.0	0.	0.99999999E 00		
44.0	0.	44.0	0.	44.0	0.99999999E 00			

## NORMALIZED SPIN DISTRIBUTION FOLLOWING EMISSION OF GAMMA RAY NO. 1

6

AG-108 +(32 MEV.) HE4

SPIN CUT OFF FACTOR = 3.000

MULTIPOLARITY OF GAMMA-RAY EMISSION 1

JF(MAX)=JI(MAX)+L=45.000

JI	JFI	JF	FJF	SUM	FJF	(JF)(JF) AVE.
0.	0.25183706E-02	0.	0.28501281E-02	0.28501281E-02	0.42828291E 02	
1.0	0.20712378E-01	1.0	0.23494826E-01	0.26344953E-01		
2.0	0.48947858E-01	2.0	0.55659250E-01	0.82004204E-01		
3.0	0.78294618E-01	3.0	0.88951297E-01	0.17095550E-00		
4.0	0.10417160E-00	4.0	0.11736256E-00	0.28831806E-00		
5.0	0.12492453E-00	5.0	0.13786193E-00	0.42617999E-00		
6.0	0.13808265E-00	6.0	0.14675605E-00	0.57293604E 00		
7.0	0.13917442E-00	7.0	0.13975077E-00	0.71268681E 00		
8.0	0.12464985E-00	8.0	0.11621327E-00	0.82890008E 00		
9.0	0.96502580E-01	9.0	0.82488748E-01	0.91138756E 00		
10.0	0.63187097E-01	10.0	0.49117755E-01	0.96056511E 00		
11.0	0.34537216E-01	11.0	0.24829402E-01	0.98499451E 00		
12.0	0.15698934E-01	12.0	0.10110700E-01	0.99510521E 00		
13.0	0.59666020E-02	13.0	0.35125383E-02	0.99861774E 00		
14.0	0.19234931E-02	14.0	0.10393063E-02	0.99965704E 00		
15.0	0.53747628E-03	15.0	0.26709834E-03	0.99992214E 00		
16.0	0.13329065E-03	16.0	0.60802919E-04	0.99998493E 00		
17.0	0.29815548E-04	17.0	0.12403354E-04	0.99999733E 00		
18.0	0.60150840E-05	18.0	0.22607490E-05	0.99999959E 00		
19.0	0.10753836E-05	19.0	0.36197282E-06	0.99999995E 00		
20.0	0.16567379E-06	20.0	0.49684773E-07	0.99999999E 00		
21.0	0.21355733E-07	21.0	0.57055977E-08	0.99999999E 00		
22.0	0.22458161E-08	22.0	0.53710305E-09	0.99999999E 00		
23.0	0.18897540E-09	23.0	0.40809135E-10	0.99999999E 00		
24.0	0.12546731E-10	24.0	0.24746249E-11	0.99999999E 00		
25.0	0.65115490E-12	25.0	0.11880146E-12	0.99999999E 00		
26.0	0.26261054E-13	26.0	0.44892946E-14	0.99999999E 00		
27.0	0.81957555E-15	27.0	0.13294035E-15	0.99999999E 00		
28.0	0.19719120E-16	28.0	0.30732890E-17	0.99999999E 00		
29.0	0.36472525E-18	29.0	0.55269222E-19	0.99999999E 00		
30.0	0.51792814E-20	30.0	0.77095103E-21	0.99999999E 00		
31.0	0.56453598E-22	31.0	0.83254017E-23	0.99999999E 00		
32.0	0.47225063E-24	32.0	0.69514884E-25	0.99999999E 00		
33.0	0.30308854E-26	33.0	0.44827691E-27	0.99999999E 00		
34.0	0.14913399E-28	34.0	0.22297750E-29	0.99999999E 00		
35.0	0.56148211E-31	35.0	0.85040794E-32	0.99999999E 00		
36.0	0.16096389E-33	36.0	0.25118208E-34	0.99999999E 00		
37.0	0.34833739E-36	37.0	0.55849406E-37	0.99999999E 00		
38.0	0.	38.0	0.	0.99999999E 00		
39.0	0.	39.0	0.	0.99999999E 00		
40.0	0.	40.0	0.	0.99999999E 00		
41.0	0.	41.0	0.	0.99999999E 00		
42.0	0.	42.0	0.	0.99999999E 00		
43.0	0.	43.0	0.	0.99999999E 00		
44.0	0.	44.0	0.	0.99999999E 00		
		45.0	0.	0.99999999E 00		

## NORMALIZED SPIN DISTRIBUTION FOLLOWING EMISSION OF GAMMA RAY NO. 2

AG-108 +(32 MEV.) HE4

J1	JFI	JF	FJF	SUM	FJF	(JF)(JF) AVE.
MULTIPOLEITY OF GAMMA-RAY EMISSION 1						
JF(MAX)=JI(MAX)+L=46.000						
0.	0.28501281E-02	0.	0.32330070E-02	0.32330070E-02	0.28501281E-02	0.38630216E 02
1.0	0.23494626E-01	1.0	0.26681492E-01	0.29914959E-01	0.23494626E-01	
2.0	0.55659250E-01	2.0	0.63234770E-01	0.93149269E-01	0.55659250E-01	
3.0	0.88951297E-01	3.0	0.10066517E-00	0.19381444E-00	0.88951297E-01	
4.0	0.11736256E-00	4.0	0.13108595E-00	0.32490039E-00	0.11736256E-00	
5.0	0.13786193E-00	5.0	0.14979954E-00	0.47469993E-00	0.13786193E-00	
6.0	0.14675605E-00	6.0	0.15239777E-00	0.62709770E 00	0.14675605E-00	
7.0	0.13975077E-00	7.0	0.13627943E-00	0.76337713E 00	0.13975077E-00	
8.0	0.11621327E-00	8.0	0.10949216E-00	0.86831929E 00	0.11621327E-00	
9.0	0.82487487E-01	9.0	0.68362294E-01	0.93668158E CC	0.82487487E-01	
10.0	0.49177556E-01	10.0	0.37249972E-01	0.97393154E 00	0.49177556E-01	
11.0	0.24429402E-01	11.0	0.16904131E-01	0.99083567E 00	0.24429402E-01	
12.0	0.10110700E-01	12.0	0.64029157E-02	0.99723858E 00	0.10110700E-01	
13.0	0.35125383E-02	13.0	0.20413442E-02	0.99927992E 00	0.35125383E-02	
14.0	0.10393063E-02	14.0	0.55543467E-03	0.99983536E 00	0.10393063E-02	
15.0	0.26709834E-03	15.0	0.13123837E-03	0.99996659E 00	0.26709834E-03	
16.0	0.60802919E-04	16.0	0.27367381E-04	0.99999396E 00	0.60802919E-04	
17.0	0.12403354E-04	17.0	0.50796615E-05	0.99999903E 00	0.12403354E-04	
18.0	0.22607490E-05	18.0	0.83596181E-06	0.99999987E 00	0.22607490E-05	
19.0	0.36197282E-06	19.0	0.12014934E-06	0.99999999E 00	0.36197282E-06	
20.0	0.49684732E-07	20.0	0.14773656E-07	0.99999999E 00	0.49684732E-07	
21.0	0.57055977E-08	21.0	0.15228886E-08	0.99999999E CC	0.57055977E-08	
22.0	0.53710305E-09	22.0	0.12939050E-09	0.99999999E 00	0.53710305E-09	
23.0	0.40809135E-10	23.0	0.89442274E-11	0.99999999E 00	0.40809135E-10	
24.0	0.24746249E-11	24.0	0.49818313E-12	0.99999999E 00	0.24746249E-11	
25.0	0.11880146E-12	25.0	0.22197729E-13	0.99999999E 00	0.11880146E-12	
26.0	0.44892946E-14	26.0	0.78686269E-15	0.99999999E 00	0.44892946E-14	
27.0	0.13294035E-15	27.0	0.22090767E-16	0.99999999E 00	0.13294035E-15	
28.0	0.30732890E-17	28.0	0.48925622E-18	0.99999999E 00	0.30732890E-17	
29.0	0.55269222E-19	29.0	0.85166595E-20	0.99999999E 00	0.55269222E-19	
30.0	0.77095103E-21	30.0	0.11611156E-21	0.99999999E 00	0.77095103E-21	
31.0	0.83254017E-23	31.0	0.12360187E-23	0.99999999E 00	0.83254017E-23	
32.0	0.69514884E-25	32.0	0.10249157E-25	0.99999999E 00	0.69514884E-25	
33.0	0.44827691E-27	33.0	0.66074426E-28	0.99999999E 00	0.44827691E-27	
34.0	0.22297750E-29	34.0	0.33057465E-30	0.99999999E 00	0.22297750E-29	
35.0	0.85407946E-32	35.0	0.12810141E-32	0.99999999E 00	0.85407946E-32	
36.0	0.25118208E-34	36.0	0.38352960E-35	0.99999999E 00	0.25118208E-34	
37.0	0.55849406E-37	37.0	0.78152975E-38	0.99999999E 00	0.55849406E-37	
38.0	0.	38.0	0.	0.99999999E 00	0.	
39.0	0.	39.0	0.	0.99999999E 00	0.	
40.0	0.	40.0	0.	0.99999999E 00	0.	
41.0	0.	41.0	0.	0.99999999E 00	0.	
42.0	0.	42.0	0.	0.99999999E 00	0.	
43.0	0.	43.0	0.	0.99999999E 00	0.	
44.0	0.	44.0	0.	0.99999999E 00	0.	
45.0	0.	45.0	0.	0.99999999E 00	0.	
		46.0	0.	0.99999999E 00		



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